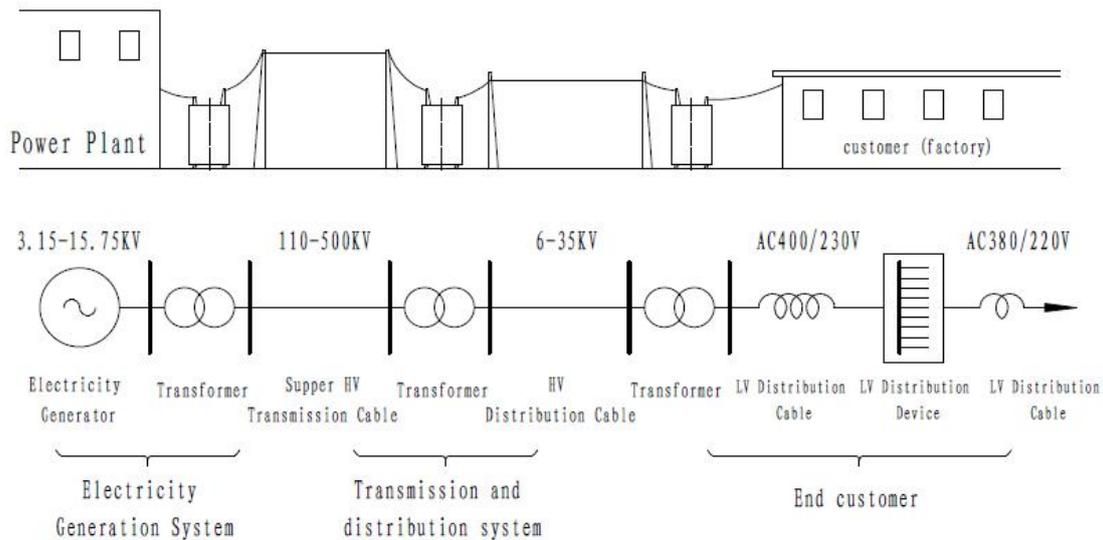




What is Voltage Optimization

1. Incoming Power Supply



The electricity usually travel very long distance from the generating plants to the customers. To ensure all customers get acceptable voltage levels considering the voltage drop and loading on the grid net work, the grid networks typically supply electricity voltage at high end of the range which is higher than required by most equipment to work at best efficiency. This can result in over voltage issues such as overheating and malfunctions, as well as increased energy usage and costs. For example Australia, statutory supply range is 230V, +10% to -6%, a range of between 253V and 216V. Averagely 247V is provided in many Australian facilities. Most connected loads, such as electrical equipment and machinery on a site, is designed to operate most efficiently at 220V to 230V. When supplied with a higher voltage, no performance gains are achieved, rather the excess energy is lost through heat or vibration. Users therefore pay for this wasted energy without gaining any increase in output. Higher voltage also means to put higher stress on the loads which decrease the life time of the loads.

And the quality and the supplied voltage from the network can vary throughout the day depending on fluctuations in demand and supply. Sags, spikes and transients in the supply can cause operational problems and damage to connected equipment.

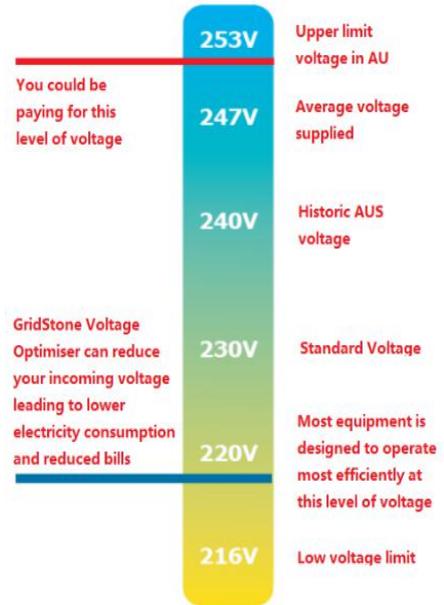
GridStone Electric Co.Ltd.

Address: ZhongShan Industry Park, 58 WenXiang East Road, Shanghai, China
Email: morningsolar@icloud.com ; jamesmeng@gridstone.cn ; www.gridstone.cn
Tel: 0086-185 0170 0304 , 0086-21 6410 8585



2. What is Voltage Optimization?

Voltage optimization aims to reduce electricity usage, power demand and cost, improve the performance and working efficiency of the loads by reducing supply voltage received. It can improve power quality by reducing harmonic and transient voltages as well as balancing phase voltages. A reduction and balancing in electricity supply voltage achieves a saving in energy consumption (kWh) and a reduction in maximum demand (KW & KVA). Voltage Optimization is not the same as Power Factor Correction.



3. When is Voltage Power

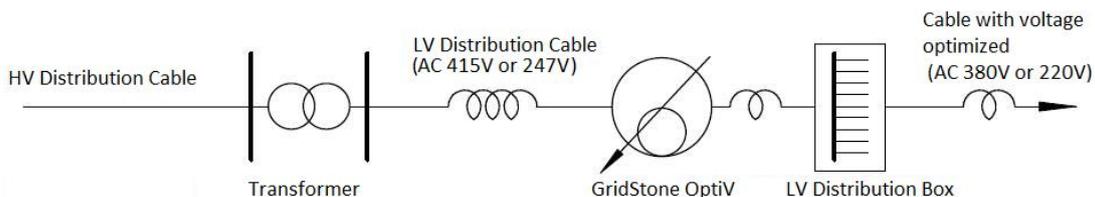
Optimization right for you?

- Unstable equipment operation due to unstable voltage.
- Overheating of transformers, switchboards and cabling
- Nuisance tripping of circuit breakers or control equipment
- High energy cost

4. How do GridStone OptiV MAX work?

GridStone Voltage optimization devices are installed in series with the incoming supply and the end user equipment, like motors. They maintain a steady and reduced output voltage, with independent phase control that further protects electrical equipment and prolongs equipment life. Further, the ability to adjust the incoming voltage allows for a reduction in harmonics and transient voltage spikes to ensure a stable and reliable power supply to plant and equipment. The benefits of voltage optimization include improved power quality, less equipment maintenance, improved equipment life, and reduced energy consumption. This can provide significant cost savings.

GridStone OptiV can be installed in front of the LV distribution box, All power passes through the voltage optimizer, which is connected downstream of the main switch and metering system. Then OptiV will save energy and protect the whole facility,

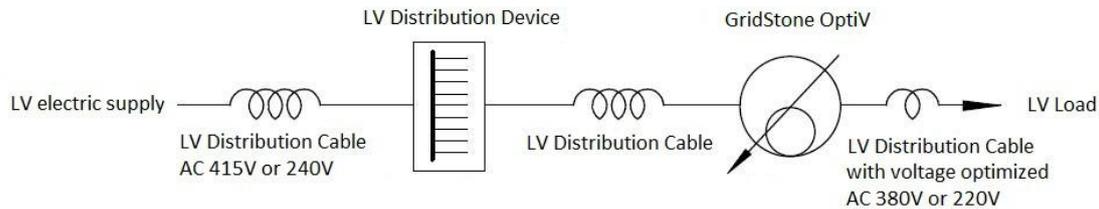


GridStone Electric Co.Ltd.

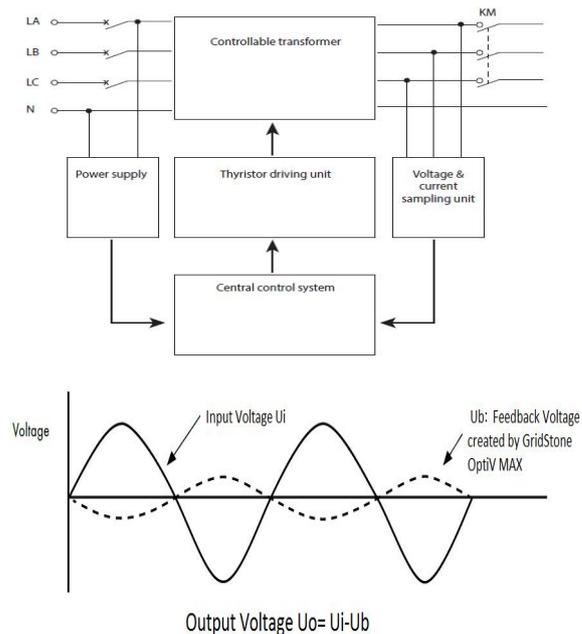
Address: ZhongShan Industry Park, 58 WenXiang East Road, Shanghai, China
Email: morningsolar@icloud.com ; jamesmeng@gridstone.cn ; www.gridstone.cn
Tel: 0086-185 0170 0304 , 0086-21 6410 8585



GridStone OptiV can also be installed near to the loads that need voltage optimization most.



When the grid voltage U_i fluctuates or load changes the output voltage is changed. With the help of 12 high-speed A/D sampling input, the MCU control system is compared with the set value. The computer program will then process, instruct the output control. With the zero-crossing synchronization pulse effect in the current, leading the related SCR to turn-on or turn-off, switch three groups of SCR combination, so that three groups of controllable transformers adjust to required positive compensation, zero, negative compensation adjustment compensation voltage of U_b and then quickly stabilize the output voltage U_o . When the input voltage U_i is higher than the required output voltage U_o , the controllable transformer will create a negative voltage U_b which is equal to $U_i - U_o$ and cause a reverse current which is real energy.



5. Benefits of using GridStone OptiV MAX

-  Cut electricity cost. Average savings of 11%-17% on energy consumption in countries like Australia, UK
-  Reduces carbon emissions
-  Manages Phase balancing
-  Protect against damaging transients (power spikes)
-  Reduce operating temperatures of motors. Improves life expectancy of equipment and reduces maintenance costs

6. Features of GridStone OptiV MAX

-  Silent design without moving brushes or rollers,
-  Easy installation and maintenance.
-  Indoor installation. Outdoor cabinet available according to order.
-  Double level, full protections and alarms against power spikes, over/under voltage , phase loss, over load and short circuit. .

GridStone Electric Co.Ltd.

Address: ZhongShan Industry Park, 58 WenXiang East Road, Shanghai, China
 Email: morningsolar@icloud.com ; jamesmeng@gridstone.cn ; www.gridstone.cn
 Tel: 0086-185 0170 0304 , 0086-21 6410 8585



-  Peak efficiency is upto 99%. Usual working efficiency $\geq 98\%$.
-  Independent or dependent phase voltage imbalance regulation. Changeable through display on the product.
-  Automatic bypass keeps the load powered. Manual bypass available according to the order.
-  Fast response speed, digital controls and operation for monitoring, performance, accuracy and customization.
-  LCD touchscreen HMI to monitor temperature, input voltage conditions, independent phase voltage and output voltage. various indexes can be set
-  Remote monitoring by RS-232 (changeable to 235, CAN)

7. Specs of GridStone OptiV MAX

Models	Capacity (kVA)	Output Current (A)	Input Voltage (V)	Output Voltage (V)	Phase	Electric Insulation	Efficiency	Waveform Distortion	Work Frequency	Voltage Regulation Accuracy	Response Time	Stabilization Time	Noise
OVM-S10	10	16	380V/220V $\pm 15\%$	220V \pm 1.5-7% adjustable (Details refer to combination table of input voltage range and output voltage regulation accuracy)	Three-Phase	AC2000V/5mA, without leakage and breakdown in 1 minute	$\geq 96\%$	$< 1\%$	50~60Hz	1.5%, 2%, 2.5%, 3%, 3.5%, 4%, 5-7% Optional	10ms	100ms	Smaller than 55dB
OVM-S15	15	23											
OVM-S20	20	31											
OVM-S30	30	46											
OVM-S50	50	76											
OVM-S80	80	122											
OVM-100	100	152											
OVM-150	150	228											
OVM-S180	180	274											
OVM-S225	225	342											
OVM-S320	320	486											
OVM-S400	400	608											
OVM-S500	500	760											
OVM-S600	600	912											
OVM-S800	800	1216											
OVM-S1000	1000	1520											
OVM-S1200	1200	1824											
OVM-S1400	1400	2128											
OVM-S1600	1600	2432											
OVM-S2000	2000	3040											
OVM-S2500	2500	3800											
OVM-S3200	3200	4860											