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All about voltage stabilizers

(to help the self-taught master)

Edition 2. Revised.

A theoretical and practical guide for those who decide to install a voltage stabilizer in their home.

UAE 2023

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Hello, dear reader!

I present to your attention the second edition. This edition has been corrected and supplemented, for example, additional chapters have appeared in it on the types of networks, how to connect a voltage stabilizer to three-phase and single-phase networks, what a manual voltage stabilizer (Variac transformer) is and what needs to be considered during its operation.

A simple layman entering a query on voltage stabilizers in a search engine will immediately stumble upon laudatory and abusive speeches of all brands, a bunch of manufacturing countries, and even with direct communication very often on the forums, experienced managers, posing as ordinary users, will give you the “right” advice to buy. Such a mass confusion is understandable - high competition does not tolerate sitting around waiting for calls, you need to spin as actively as possible, but it seems that all stabilizers are of the same type, where the buyer is essentially presented only with a choice in terms of price and appearance of the device. And this is not so at all. The main thing in a voltage stabilizer is its functional filling, its operating range, quality and type of execution. This book is devoted precisely to the detailed separation of the types of voltage stabilizers for the correct choice of rating and type of stabilizer.

Also, in the process of writing the book, materials from the Internet were used, all links are presented at the end of the book in the "literature" list.

What are we talking about?

Before we begin to delve into the issues of voltage stabilization in more detail, let's define the basic concepts that we will meet in the text and understand what kind of device a voltage regulator is and why it is needed. If you are technically savvy and feel confident in the “Electricity” section of physics, then scroll through this page, it will seem boring and uninteresting to you.

So, in short:

Voltage - is a physical quantity that characterizes the action of an electric field on charged particles.

Current strength - is a scalar quantity, numerically equal to the charge flowing per unit time through the conductor section.

Power. When calculating the power consumed by the device, the so-called apparent power must be taken into account. Apparent power is all the power consumed by an electrical appliance, it consists of active power and reactive power, depending on the type of load. Active power is always indicated in Watts (W), reactive power in Var (volt-ampere reactive) apparent - in volt-amperes (VA). Devices - consumers of electricity often have both active and reactive components of the load.

Full power:

$$S = \sqrt{P^2 + Q^2} \quad (1)$$

Where P - is active power, Q - is reactive power.

Active load. For this type of load, all consumed electricity is converted into other types of energy (heat, light, etc.). For some devices, this component is the main one. Examples are incandescent lamps, heaters, electric stoves, irons, etc. If their indicated power consumption is 1 kW, a 1 kVA voltage regulator is sufficient to power them.

Reactive load. They, in turn, are divided into inductive and capacitive. An example is devices containing an electric motor, electronic, household appliances. Apparent power in volt-amperes and active power in watts are related by the coefficient COS(Fi). On devices that have a reactive component of the load, their active power consumption in watts and COS (Fi) are often indicated. To calculate the apparent power in VA, you need to divide the active power in W by COS(Fi). For example: if a drill says 600 W and COS(Fi)=0.6, this means that the total power actually consumed by the tool will be 600/0.6=1000 VA. If COS(Fi) is not specified, the real power can be divided by 0.7 for a rough calculation.

Now let's go directly to the definition of a voltage stabilizer. So, **a voltage stabilizer** - is an electrical energy converter that allows you to get a voltage at the output that is within the specified limits with much larger fluctuations in the input voltage and load resistance [1]. **A voltage stabilizer (regardless of the types described below) -** is a device designed to protect equipment from unstable power supplies and network failures. To maintain a stable 220 volts for your appliances, no matter how the input voltage changes, a voltage stabilizer is suitable. The stabilizer is connected to a current source (perhaps it is an input to a house, a summer house, etc.) at one end, and the other end is connected to the equipment. The input voltage is constantly monitored and checked regularly. An automatic voltage regulator does not require any human intervention, but regulates the voltage automatically whenever there is a power surge or there is a pulse of energy that can reach the connected equipment [2].

Network types. Basic concepts.

Many have heard such mysterious words as **one phase, three phases, zero, grounding or earth**, and they know that these are important concepts in the world of electricity. However, not everyone understands what they mean and what relation they have to the surrounding reality. However, it is a must to know.

Without going into technical details that a home master does not need, we can say that **a three-phase network -** is a method of transmitting electric current when alternating current flows through three wires and returns one at a time. The above needs some clarification. Any electrical circuit consists of two wires. By one, the current goes to the consumer (for example, to a kettle), and by the other it returns back. If such a circuit is opened, then the current will not flow. That's the whole description of **a single-phase network** (Fig. 1).

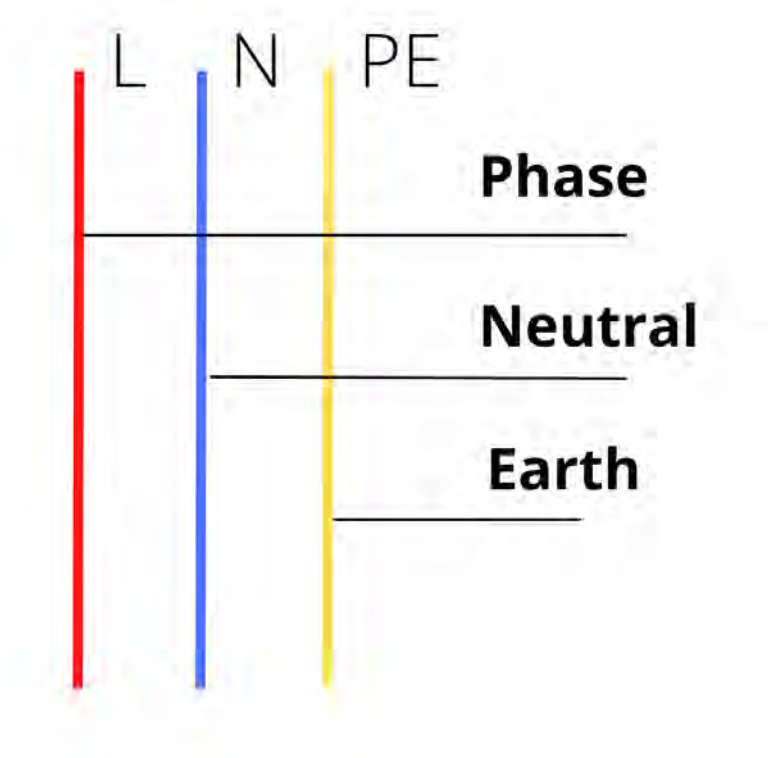


Fig. 1. **Diagram of a single-phase circuit.**

The wire through which the current flows is called phase, or simply phase, and through which it returns - neutral. A three-phase circuit consists of three phase wires and one return. This is possible because the phase of the alternating current in each of the three wires is shifted with respect to the neighboring one by 120 ° C (Fig. 2). A textbook on electromechanics will help answer this question in more detail.

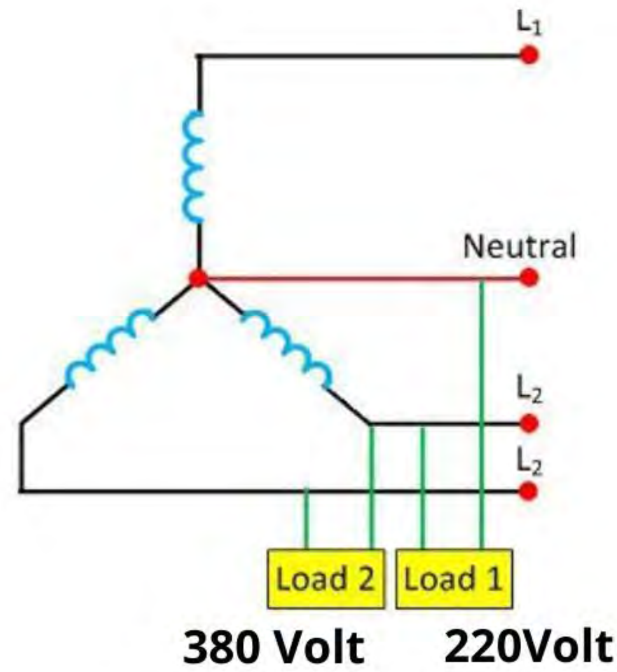


Fig. 2. **Diagram of a three-phase circuit.**

The transmission of alternating current occurs precisely with the help of three-phase networks. This is economically beneficial - two more neutral wires are not needed. Approaching the consumer, the current is divided into three phases, and each of them is given zero. So he gets into apartments and houses. Although sometimes a three-phase network is brought directly into the house. As a rule, we are talking about the private sector, and this state of affairs has its pros and cons. This will be discussed later.

Earth, or, more correctly, **grounding (earth)** - is the third wire in a single-phase network. In essence, it does not carry a workload, but serves as a kind of fuse.

This can be explained with an example. In the event that electricity gets out of control (for example, a short circuit), there is a risk of fire or electric shock. To prevent this from happening (that is, the current value should not exceed a level that is safe for humans and devices), grounding is introduced. Through this wire, excess electricity literally goes into the ground (Fig. 3).

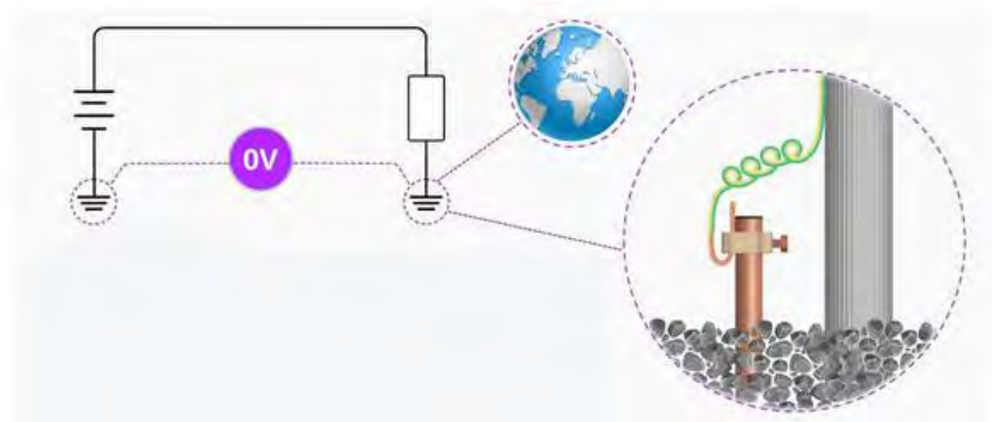


Fig. 3. **The simplest grounding scheme.**

One more example. Let's say that a small breakdown occurred in the operation of the electric motor of the washing machine and part of the electric current falls on the outer metal shell of the device. If there is no grounding, this charge will wander around the washing machine. When a person touches it, he will instantly become the most convenient outlet for this energy, that is, he will receive an electric shock. If there is a grounding wire in this situation, the excess charge will drain through it without harming anyone. In addition, we can say that the **neutral conductor** can also be grounding and, in principle, it is, but only at a power plant.

Some craftsmen, relying on basic knowledge of electrical engineering, install the **neutral wire** as a grounding wire. Never do that. In the event of a break in the neutral wire, the housings of grounding devices will be energized with 220 V. In 99% of cases, a single-phase network is installed for an apartment. It is very easy to distinguish it from a three-phase one. If there are 3 or 2 wires in the incoming cable, then the network is single-phase, when 5 or 4 - three-phase (Fig. 4).

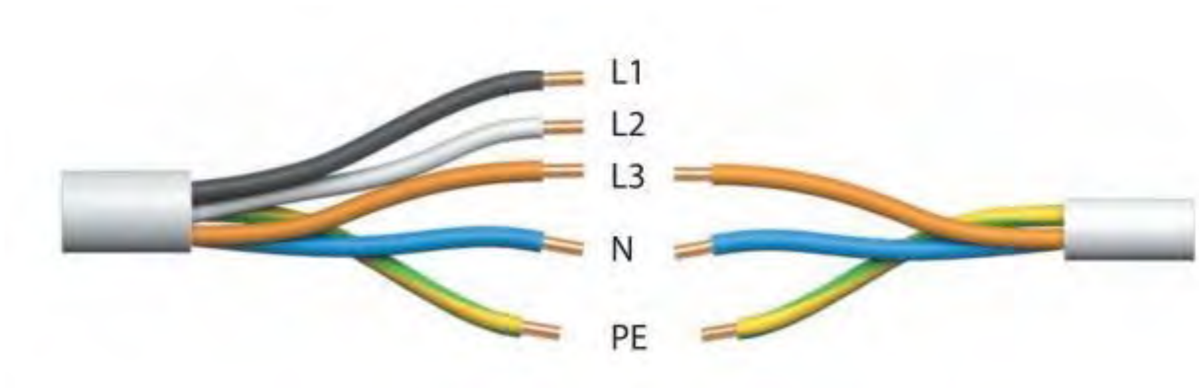


Fig. 4. **The cable becomes a four-core or two-core cable if the ground wire is removed.**

As you know, three-phase current flows through wires that transmit energy over a distance - this is more profitable. He enters the apartment single-phase. The splitting of a three-phase circuit into 3 single-phase circuits occurs in the **ASP**. A five-core cable enters there, and a three-core cable comes out (Fig. 5).

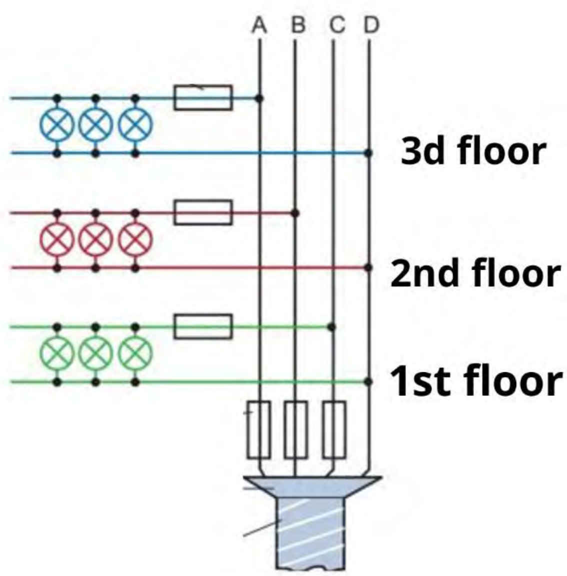


Fig. 5. **Scheme of splitting a three-phase network into single-phase consumers.**

When asked where 2 more go, the answer is simple: they feed other apartments. . This does not mean that there are only 3 apartments, there can be as many as you like, as long as the cable can withstand. Just inside the shield, a three-phase circuit is disconnected into single-phase circuits (Fig. 6).

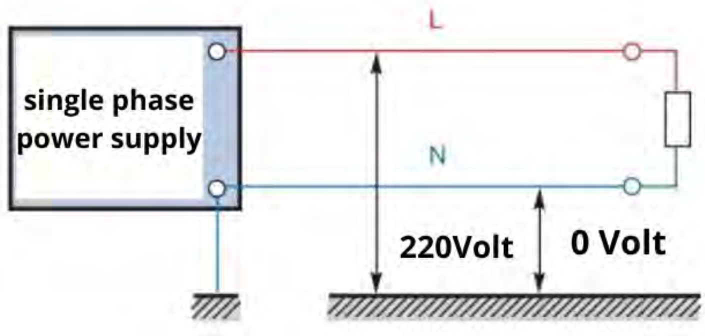


Fig. 6. **Single-phase electrical network**.

Zero and **grounding** are added to each phase leaving the apartment, and this is how a three-core cable is obtained.

Ideally, in a **three-phase network**, there is only one zero. More is not necessary, since the current is shifted in phase relative to each other by one third. Zero - is a neutral conductor in which there is no voltage. It has no potential relative to the ground, in contrast to the phase, in which the voltage is **220 V**. In a "phase-phase" pair, the voltage is **380 V**. In a three-phase network to which nothing is connected, there is no voltage in the neutral conductor. The most interesting thing starts to happen when the network is connected to a single-phase circuit. One phase enters the apartment, where there are 2 light bulbs and a refrigerator, and the second - where there are 5 air conditioners, 2 computers, a shower cabin, an induction cooker, etc. (Fig. 7).

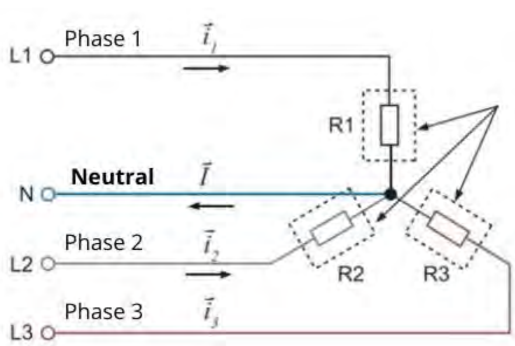


Fig. 7. **Three-phase electrical network.**

It is clear that the load on these 2 phases is not the same and there is no talk of any neutral conductor. Voltage also appears on it, and the more uneven the load, the greater it is.

The phases no longer cancel each other out to add up to zero. Recently, the situation with non-compensation of currents in such a network has been aggravated by the fact that new electrical appliances have appeared, which are called pulsed. When switched on, they consume much more energy than during normal operation. These pulse devices, coupled with a different load on the phases, create such conditions that a voltage appears in the neutral conductor (zero), which can be 2 times more than on any phase. However, the neutral is the same **section** as the phase conductor, and the load is greater.

That is why recently a phenomenon called zero burnout has **increasingly appeared** - the neutral conductor simply cannot cope with the load and burns out. It is not easy to deal with such a phenomenon: you must either increase the cross section of the neutral wire (and this is expensive), or evenly distribute the load between 3 phases (which is impossible in an apartment building). At worst, you can buy a step-down isolation transformer, also known as a **voltage stabilizer.**

In a private **house**, the situation is better, since the owner is alone and it is much easier to distribute electricity in phases. It is even a fascinating activity - **to calculate the power** of electrical appliances and distribute them in phases so that the load is the same. All calculations are made approximately, and it does not mean at all that you need to turn on the light and 2 TVs, and if the carpentry machine on the street has started working, this is too much. It all depends on the desire of the owner of the house: to conduct a three-phase network or a single-phase network. There are pros and cons here.

Cons of a three-phase network 2.

1. The voltage in a separate section is highly dependent on the work of others. If one of the phases is overloaded, the others may not work correctly. It can

show up in any way. To prevent this from happening, you need a stabilizer - a thing not cheap.

2. You need equipment in the shield, designed specifically for a three-phase network, as well as the cost of installing a three-phase network. They will be more than for single-phase. In addition, you need to know the rules for operating three-phase networks.

The advantages of a three-phase network are also 2.

1. A three-phase network allows you to get more power. If a single-phase network with a total power of devices of 10 kW is already experiencing overloads, then a three-phase network copes well with 30 kW. The example is very simple. If only 1 phase enters the house from the power line, then with an incoming conductor cross section of 16 mm2, the maximum power will be only 14 kW, and if all 3 phases, then already 42 kW. The difference is very noticeable.
2. It becomes unusually easy to connect electrical appliances that have a three-phase power supply (electric stoves). The most important thing in the case of a private house is three-phase electric motors, which are on many machines. Some information was used from the resource [9].

Types of stabilizers.

Having defined the basic concepts that we will meet and having determined the most important thing - what is a voltage stabilizer, let's move on to an important chapter of our book - to the types of voltage stabilizers. So, we have determined that the task of the voltage stabilizer is to stabilize the voltage and clean the input voltage from various high-frequency fluctuations. The type of stabilizer is the type of mechanism by which it does it all.

Relay type of voltage stabilizers. Relay stabilizers are the most widely used due to the optimal ratio of the necessary parameters and price. Undeniably, their main positive side is their speed. In a fraction of a second, such stabilizers return the voltage to acceptable limits, thereby protecting our equipment. Of the minuses, we can say this is that when the relay is switched, a voltage jump occurs (5-15 Volts, depending on the manufacturer). For technology, this is not essential and safe, but the light will blink. Therefore, when switching the stabilizer, a slight flashing of the incandescent bulbs may be observed! Fluorescent and energy-saving lamps do not blink! The relay stabilizer circuit is conditionally presented below.

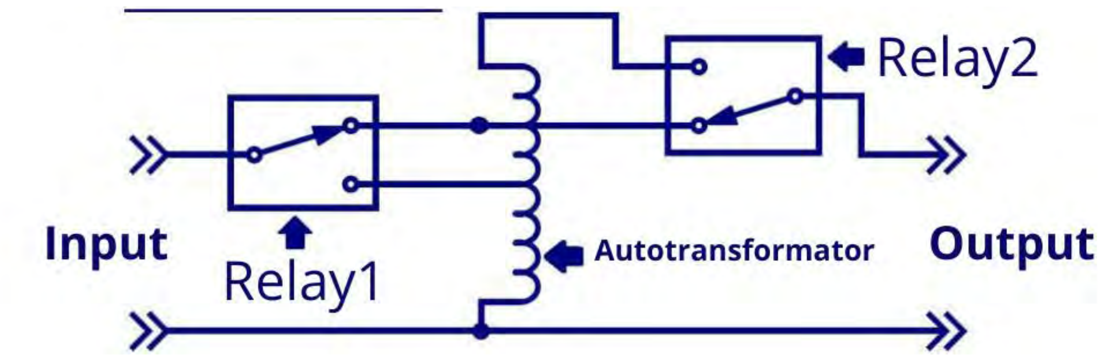


Fig. 8 **Relay type stabilization.**

Like all modern voltage stabilizers, it is based on a power transformer and an electronic unit. The electronic unit of a modern relay voltage stabilizer is a fairly powerful microcontroller that analyzes the input and output voltage and generates signals to control the keys or power relays of the stabilizer. When forming the control voltage, the microcontroller takes into account the response time of the keys and power relays. This allows for almost seamless switching. As a result, the voltage shape at the output of the relay stabilizer repeats the shape at the input.

Servomotor voltage stabilizers - the principle of their operation is as follows: the control board analyzes the input voltage to the stabilizer, depending on the situation, transmits a signal to the motor located inside the toroidal coil, and this motor moves the current collector brush by the required number of turns.

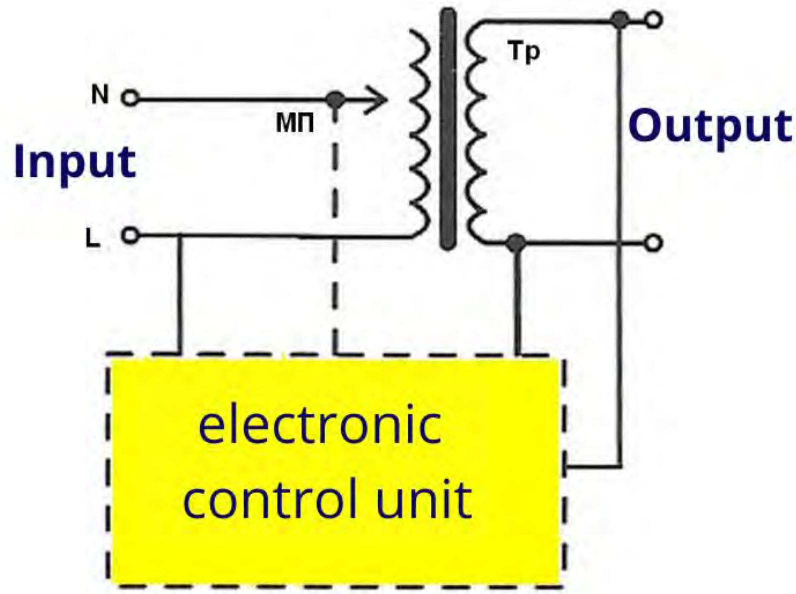


Fig.9 **Servomotor type of stabilization.**

This principle of operation provides a higher stabilization accuracy (2-3%, compared with relay 5-8%). But the speed of the brush is limited by the capabilities of the motor, most often the speed of adding 10-15 Volts / sec. With power surges of 30-40 volts, devices can be under dangerous voltage for a few seconds. And it’s also worth paying attention, for some manufacturers, the motor itself is powered by the input voltage, and therefore when there is a strong voltage drop, it simply does not have enough power and the stabilizer “freezes”. But for light, this is the best choice, although the light will "sag" during power surges, but not as much as a relay one and more gently. This type of stabilizer is recommended in a network where the voltage is stably underestimated or overestimated.

Thyristor (triac) voltage stabilizers - the principle of operation is based on automatic switching of sections (windings) of an autotransformer (or transformer) using power switches - thyristors. In some ways, this type is similar to relay stabilizers, but unlike them, they do not have a contact group, they have much more stabilization steps and greater accuracy from 2% to 5%. The comfort of using such a stabilizer is immediately visible - silence in the house is guaranteed. The inclusion of thyristors in the AC circuit (primary winding of the transformer) allows you to build an AC voltage regulator with high efficiency.

Scheme for constructing thyristor AC voltage stabilizers

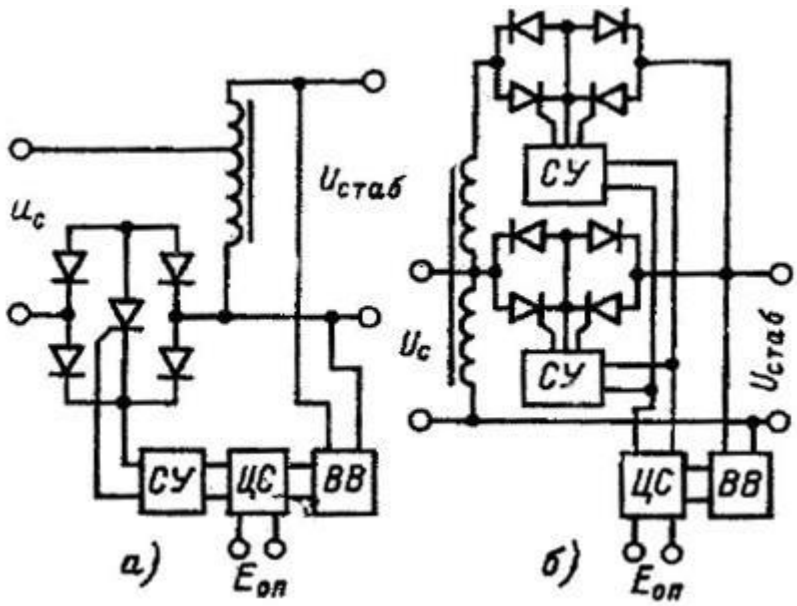


Fig.10 **Scheme with a double-sided key on one thyristor.**

Simplicity and reliability are the advantages of AC stabilizers. The disadvantage is the significant dependence of the output voltage on the frequency of the mains current and a noticeable distortion of the sinusoidal voltage waveform. Stabilizers made on inductors with saturated cores have a large stray magnetic field, which can dangerously affect the operation of surrounding devices and possibly a person.

Additional functions of voltage stabilizers.

In addition to the main function of voltage stabilizers - stabilization, it is important for us as users to have access to information about what is happening on the network now, why the voltage stabilizer behaves in one way or another. What is the minimum set of functions required:

1. Output voltage analysis. The stabilizer must be equipped with an information (digital or pointer) display that shows the output voltage. If the stabilizer has an input voltage analysis function, this will be additional useful information.
2. At high ratings (usually from 3000 VA), the “Bypass” function is installed - a function in an electronic device (signal processing, voltage stabilization, etc.), which allows switching the input signal directly to the output, bypassing all functional blocks [1]. That is, the ability to turn on the network bypassing the voltage stabilizer. If the voltage has returned to normal or you do not need a stabilizer now, press the lever up and the voltage goes bypassing the stabilization blocks.
3. Types of mounting voltage stabilizers. There are two types of mounting voltage stabilizers - floor and wall mounting. Floor execution implies that the stabilizer is on the floor, shelf. Such an arrangement is not always convenient, because especially large denominations cannot be placed on a shelf because of their weight, and on the floor they occupy quite large areas. When mounted, the stabilizers are made flatter for the convenience of customers. In principle, they can also be used in the floor version, only often the information part of the display is in this case "upside down" to the user. For example, in our SUNTEK stabilizers, we tried to take into account all the wishes of consumers and somewhat beveled down the information part of the stabilizer, thereby providing a convenient analysis of information from the display both in the hinged position and in the floor. This case is called universal.
4. Many models on the voltage stabilizer market use a delay button. This is done so that if the mains voltage fails or temporarily goes beyond the operating range, then the equipment will come to rest during this delay time until the next power-on. In many stabilizers, the delay button is offered in several ranges -6, 90, 120 sec. In more modern models, the delay has already become automatic, and when it turns on, it shows the consumer on the display the time the stabilizer is turned on in the form of a countdown.

Connecting Voltage Stabilizers.

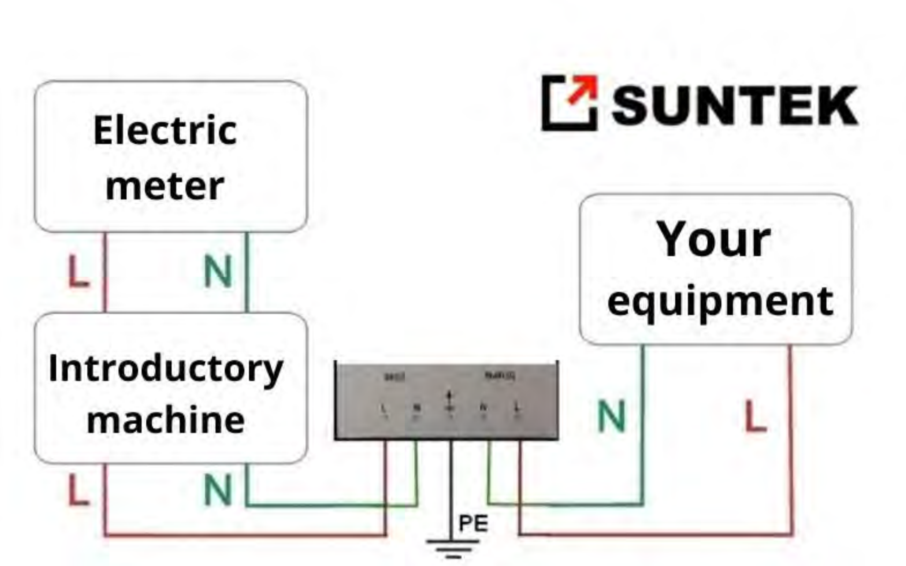
So, the voltage stabilizer is acquired. It is very good if you know a good electrician or have the opportunity to invite a specialist. If this is not possible, then you will have to act on your own. First, choose a place to install the stabilizer, it should be dry, dust-free and easily ventilated. The stabilizer itself must be carefully unpacked, familiarized with its external device using the product passport. If the stabilizer was transported at sub-zero temperatures, it is necessary to keep it at room temperature for at least four hours before connecting it. This is due to the fact that all voltage stabilizers are primarily afraid of the formation of condensate inside. Therefore, you need to wait until it forms and dries.

At the time of switching on, pay attention that the stabilizer is turned off - the power button is in the “Off” position and the stabilizer must be connected to a socket with grounding contacts (Euro socket), otherwise the stabilizer must be grounded separately (or there must be a connection terminal on the terminal block). After the stabilizer is turned on, the countdown most often turns on on the scoreboard - this turns on the delay. There is one more very important point! Some manufacturers do not inform the buyer in the passports how to properly connect the stabilizer. If you have bought and you do not have such information, it is better to contact the manufacturer, but in most cases the connection goes like this:

Fig.12 Connecting the stabilizer through the terminal block

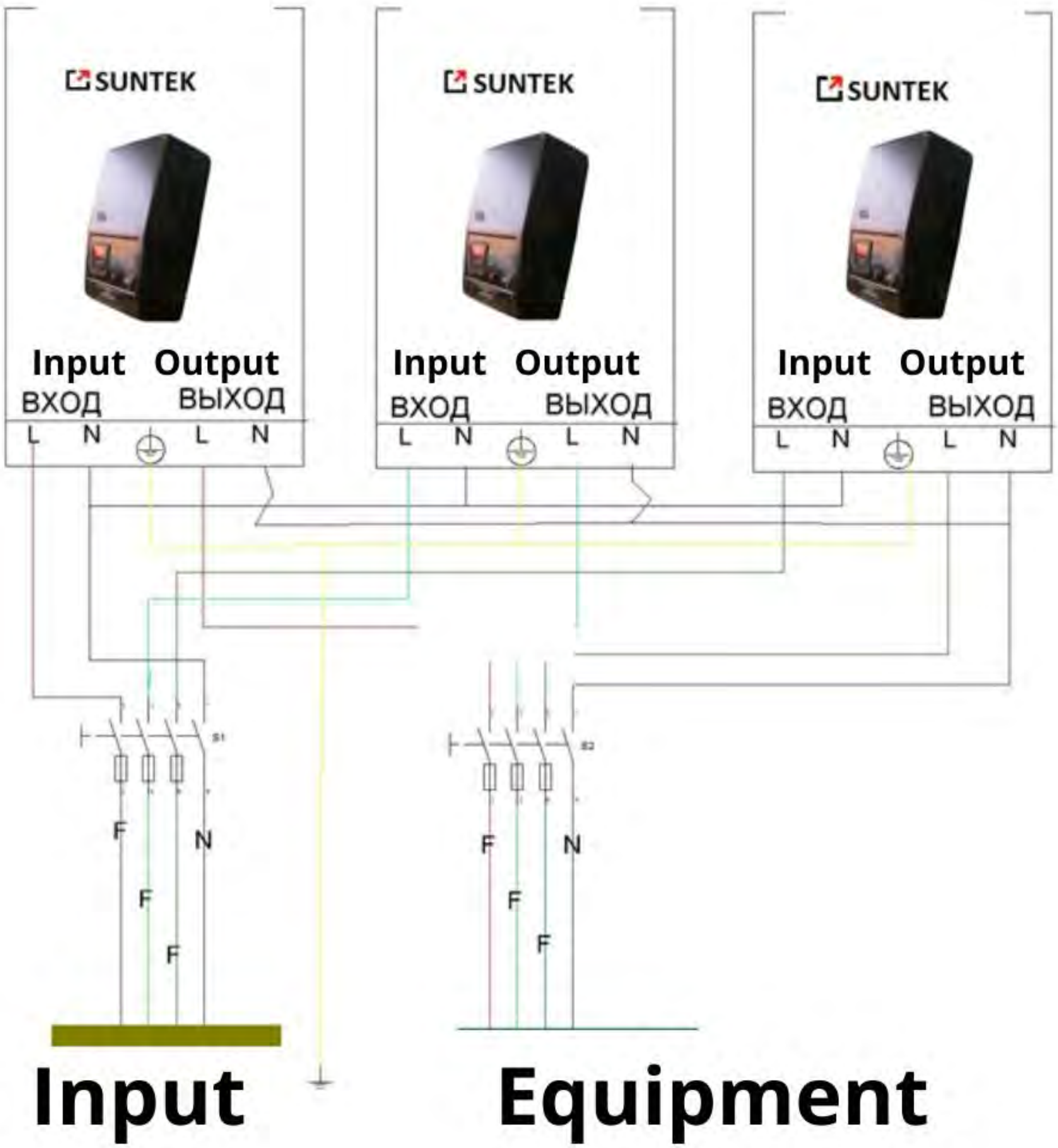
Pay attention - Phases are on the edges of the terminal block, zeros are closer to the center, and the earth is in the middle!

It is important to pay attention to whether your network is single-phase or three-phase.



The figure shows a diagram of connecting SUNTEK voltage stabilizers to a single-phase network.

An example of connecting to a three-phase network.



Very often, the indication of voltage stabilizers from many manufacturers is the same.

During operation, the following information may appear on the display of the stabilizer: **Letter "H".** The appearance of the letter "H" on the display means that the voltage in the network has risen above the operating range and the overvoltage protection has tripped, the stabilizer turned off the output voltage to avoid damage to the load. When the input voltage returns to the operating range, the output voltage figure will reapear on the display and the stabilizer will automatically switch to the operating mode.

Letter "L". The appearance of the letter "L" on the display means that the voltage in the network has dropped below the operating range and the undervoltage protection has tripped, the stabilizer turned off the output voltage to avoid damage to the load. When the input voltage returns to the operating range, the output voltage will reappear on the display and the stabilizer will automatically switch to the operating mode.

Letters"C-H". The appearance of the letters "C-H" on the display means that the total power of the devices connected to the stabilizer has exceeded the rated power of the stabilizer and the thermal protection has tripped. You need to reduce the load. Further, the stabilizer itself will automatically switch to operating mode.

During the operation of the stabilizer, it is necessary to carry out:

1. Inspection of the body of the stabilizer and the wires connected to it to identify their damage (once a month);
2. Removing dirt and dust from the surfaces of the stabilizer body with a brush or dry rags.

How to choose the right voltage stabilizer for power.

Choosing the power of a voltage stabilizer when buying is one of the most important tasks, if you do it correctly, you will ensure a quiet long life for yourself and your equipment.

- look at what introductory automaton you have in the phase. This determines the load level allowed for your facility (house). It makes no sense to take a significantly higher power rating. For example, you have a 25 A automatic. That is, the power limit is 25A * 220V = 5500 VA, that is, you can take a 5000 VA or 8500 VA stabilizer, it makes no sense to take more, in addition, it becomes possible to turn off your introductory machine when you turn on a powerful stabilizer (high starting currents "knock out" the machine).
- Calculate the total load of all devices. Divide it into two parts - with engines and without. This must be done in order to correctly take into account the starting and reactive currents (approximate powers are given in Table1.

Appliances		**Power tool**	
consumer	**power, VA**	**consumer**	**Power, VA**
hair dryer	450-2000	drill	400-800
iron	500-2000	perforator	600-1400
electric stove	1100-6000	electric grinder	300-1100
toaster	600-1500	Circular Saw	750-1600
coffee maker	800-1500	electric planer	400-1000
heater	1000-2400	jigsaw	250-700
grill	1200-2000	sanding machine	650-2200
vacuum cleaner	400-2000		
radio	50-250	**electrical appliances**	
TV set	100-400	compressor	750-2800
refrigerator	150-600	water pump	500-900
oven	1000-2000	circular saw	1800-2100
Microwave oven	1500-2000	air conditioner.	1000-3000
computer	400-750	electric motors	550-3000
electric kettle	1000-2000	fans	750-1700
electric lamps	20-250	mower	750-2500
boiler	1200-1500	high pump pressure	2000-2900

Table 1. Rated power consumption of household appliances.

All non-motorized appliances sum up the numbers as written on them, and the power indicated on appliances with motors must be DIVIDED by 0.7 (this is a correction factor to take into account the reactive component arising from rotating elements).

- If possible, measure the voltage in the network, study how much it blinks, how much the lights blink. This gives an idea of the drawdowns (usually a double-fading light bulb receives not 220 Volts, but 170-180 V.)

There is also the concept of inrush currents, that is, when, at the moment of switching on, the device requires such an amount of energy that is several times higher than the amount used to operate the device in normal mode. Table 2 shows the average starting currents for electrical appliances.

Important!!! SUNTEK stabilizers are specially adapted for inrush currents and can withstand them up to 1 second! That is, when buying a SUNTEK stabilizer, you need to take into account the starting currents only for the devices of the last line of Table 2.

Consumer	Starting current ratio	Starting current pulse duration, s
Incandescent lamps.	5..13	0,05..0,3
Alloy electric heaters: nichrome, fechral, chromal.	1,05..1,1	0,5..30
Fluorescent lamps with starters.	1,05..1,1	0,1..0,5
Computers, monitors, TVs and other devices with a rectifier at the input of the power supply.	5..10	0,25..0,5
Consumer electronics, office equipment and other appliances with a transformer at the input of the power supply.	до 3	0,25..0,5
Devices with electric motors, including refrigerators, pumps, air conditioners.	3..7	1..3

Table 2. Starting currents of electricity consumers.

Example: Consider a house, two floors, one phase. Introductory machine - 50A. The house has light, washing machine, refrigerator, TV, computer. So, the machine limits the load to 11000 VA. Let's see what our load gives if it is turned on at the same time. Without engine: light (50+50+50+50+50) + TV (300) +

computer (we don't take into account the small cooler) (700)=1250 VA. With motor: washing machine 2000VA/0.7=2850VA.

Total total: 1250+2850=4100 VA.

We measure the voltage in the evening, let's say 190 volts. If we choose, for example, a SUNTEK voltage stabilizer, then the optimal power of the voltage regulator with a margin of 5000 VA. If you plan to add a significant load, then you can take 8500VA or 11000 VA. If you choose another brand, please study the operating range of the stabilizer.

Voltage stabilizer selection examples (examples are made on the basis of SUNTEK stabilizers, but you should take into account the parameters of your stabilizer)

The material of this Chapter is provided by the source [5]

Voltage stabilizer for home (country house).

In this case, you need to know:

1. What is the total maximum power of the devices (for devices with motors, you need to divide the power of the device by 0.7)
2. What is the minimum voltage at home (measure with clamp pliers)
3. Know the power of the introductory machine (it is desirable that the value of the introductory machine be MORE THAN or EQUAL to the nominal value of the stabilizer machine.

According to these parameters, you can choose the right voltage stabilizer. According to our experience, SUNTEK 8500 or SUNTEK 11000 VA stabilizers are taken to the house, country house, cottage.

Voltage stabilizer for boilers (boiler).

Reliable and trouble-free operation of such installations is possible only under certain conditions, namely, if there is a high-quality power supply. Unfortunately, it is with this indispensable condition that problems most often arise. To solve this problem, it is necessary to install a voltage stabilizer for the boiler. First of all, we will consider the reasons why we want to install a voltage regulator for the boiler, and then we will dwell on the question of which voltage regulator we need for the boiler.

What is the danger of voltage fluctuations for heating equipment?

1) Despite the fact that the controller (or, more simply, the computer that controls the boiler) has its own voltage regulator, its normal operation is guaranteed at a mains voltage of 220 plus or minus 10% V. A failure in its operation can create an emergency situation.
2) Boiler fittings include solenoid valves and gate valves. Reduced voltage leads to their incomplete closing or opening, and increased to failure. These circumstances also require the installation of a voltage stabilizer for the boiler.
3) Changing the operation mode of the fans leads to a change in the composition of the fuel mixture and unstable combustion.
4) With significant deviations in the supply voltage, fans and pumps have a high probability of failure.
5) Almost all manufacturers of heating equipment recommend installing a boiler voltage stabilizer, and for many this is one of the conditions for providing a guarantee. We recommend voltage stabilizers SUNTEK 550, 1000, 1500 VA for the boiler.

Voltage stabilizer for TV.

In this case, the task of the voltage stabilizer is not only to supply a stable voltage to the TV, but also to protect it from sudden surges, because. this is dangerous especially for plasma and LCD TVs. To do this, we installed a protection system in the stabilizer, which will ensure the quiet operation of the TV even with jumps of

50 volts.
We recommend the SUNTEK-550 VA TV or if the screen is large, then the SUNTEK-1000 VA.

Voltage stabilizer for computer.

The computer consists of a block and a monitor. Therefore, the power must be summed up. Also, if additional devices (scanner, printer, etc.) are also included in the stabilizer, then all the power must be summed up and the result obtained compared with the line of ratings of the voltage stabilizers under consideration. For example, stabilizers SUNTEK 1000 and 1500 VA fully provide uninterrupted operation of one or two computers, printer, scanner and MFP unit.

Voltage stabilizer for the refrigerator.

In this case, we are dealing with a device that has both inrush currents and a reactive component. Therefore, the choice is as follows:
We look at what power the refrigerator is indicated on the nameplate (passport). Next, we divide it by 0.7 and multiply by 2. in this way we will choose the correct value. Let's say a 500 VA refrigerator, then it turns out that the SUNTEK 1500 VA voltage regulator (500 / 0.7 * 2) is optimal for it.

Voltage stabilizer for washing machine.

In this case, the circuit is similar to the circuit with a voltage stabilizer for a refrigerator, but you do not need to multiply by 2, because. starting currents here are significantly less than the currents of the refrigerator compressor.

Let's say a 2000 VA washing machine. Then we divide by 0.7, we get 2857 VA, that is, the closest value of SUNTEK-3000BA.

Voltage stabilizers with manual adjustment – Variac transformer.

Laboratory autotransformers (Variacs), devices with manual adjustment of the output voltage, were widely used. Their main application is in laboratories where it is necessary to obtain an accurate non-standard voltage at the output. But

gradually from the laboratories LATRs moved into our everyday life. At one time, many of them were on the TV, but now their application is diverse - from various technological processes (poultry farming, repair shops, dentistry, etc.) to devices with an operating voltage of 110 volts (it is easy to set such an output voltage on LATR). There are LATRs with an operating range from 0 to 250 Volts, there are with an extended range up to 300 Volts. The increased range gives the LATR additional power, allowing it to lift high loads from a lower voltage. It must be understood that the laboratory autotransformer operates in the manual setting of the output voltage, that is, you yourself set the additional voltage to the input, the so-called "delta". For example, you have a 200 volt outlet. You install LATR, and by turning the control knob you get 220 volts at the output. "Delta" in your case was 20 volts. If the voltage in the network changes, it becomes 180 Volts, then LATR will add only the indicated “delta” of 20 Volts, thus the output will be 200 Volts - an adjustment is necessary. The LCD panel allows you to set the output voltage with an accuracy of 1 Volt! If you need a clearly stabilized voltage of 220 volts, then it is better to install a voltage regulator.

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