



# THREE-PHASE NORMALIZERS OF AC VOLTAGE «NORMEL» series ESSV-I

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**Dear customers!**

**We ask you to study the present manual carefully and follow its requirements for correct and safe exploitation of the equipment «NORMEL» series ESSV-I**

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The present technical passport is a document certifying the main parameters guaranteed by the enterprise-producer, technical characteristics of three-phase energy saving normalizer of AC voltage NORMEL of series ESSV-I and allowing to get acquainted with the order of its switching on and servicing, as well as with safety rules of exploitation.

**i ATTENTION!**

In the normalizer, switched into the grid, the voltage is dangerous for life. Only those people are admitted to the work with the normalizer who have studied the present manual and the rules of electric safety for work with devices up to 1000 V.

For switching on the normalizer into the grid we recommend to use the service of a qualified and certified specialist or installation company.

## APPLICATION

The normalizer is designed for power supply of various electric equipment, devices and gadgets with normalized three-phase voltage of alternating form in conditions when the voltage does not correspond to the requirements of Russian National Standard GOST 54149-2010.

The normalizer is switched into the supply net of AC voltage of 380V and frequency 50 hertz. The device does not distort the parameters of the supply net.

The normalizer is provided with a highly effective function of protection from extra voltage of the line.

### OPERATION CONDITIONS:

The environment is non – explosive, does not contain current-conducting dust, aggressive vapors and gases in concentrations destroying metals and isolations;

the absence of increased vibration, shaking, bumps;

the temperature range of the environment, C.....from -40 to +50;

relative moisture of the air at the temperature 25 °C, %, not more than.....90;

atmospheric pressure, kPa.....100±4;

the degree of protection of the normalizer according to Russian National Standard GOST14254-96.....P30 (non-pressurized).

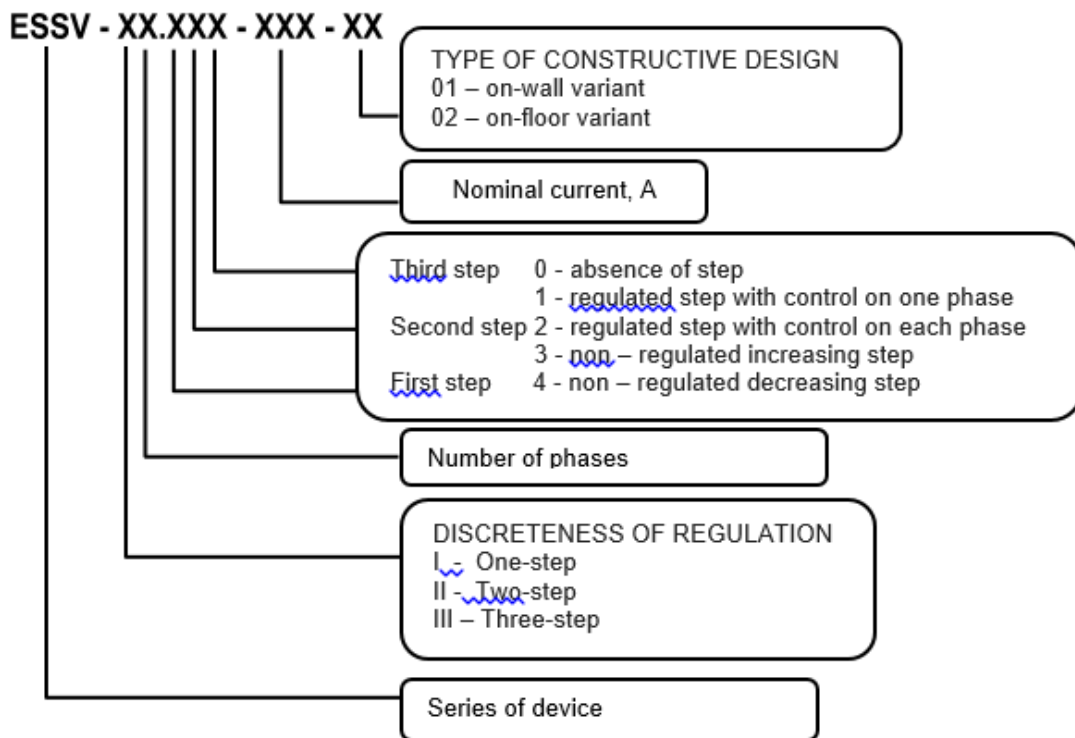
## CONFIGURATION

Name	Quantity
Energy saving normalizer of AC voltage NORMEL series ESSV-I	1
Technical passport	1
Package	1

## TECHNICAL CHARACTERISTIC

Voltage in supply line, V.....380/220;  
Frequency, hertz.....50;  
Load current on phase, A.....from 30 to 400;  
Efficiency, %, not less than.....99.7;  
Type of load.....any;  
The system of filters is non-commutation, continuous-action at any input parameters of the net;  
Commutation operation speed, ms..... not more than 20;  
Protection from currents of extra loads and short circuits;  
The type of climatic production of the device.....according to GOST 15150-69 УХЛ4;  
The degree of protection with the coat according to GOST 14254-96 category from IP-20 to IP-66.

## CODING



Example:

The normalizer of nominal capacity 110 kVa and nominal current 160A has the following coding:  
 ESSV-I 3.200-160-02

## NOMECLATURE OF DEVICES

Series ESSV-I Normalizer three-phase one-step with voltage control on each phase					
Type	Nominal current, A	Maximum load capacity, kVa	Range of input voltage in the net, V	Dimensions, mm	Weight, kg
ESSV-I 3.200-050-02	50	35	170-260	800x750x350	80
ESSV-I 3.200-080-02	80	55	170-260	800x750x350	92
ESSV-I 3.200-130-02	130	85	170-260	800x750x350	101
ESSV-I 3.200-160-02	160	110	170-260	800x750x350	118
ESSV-I 3.200-205-02	205	135	170-260	800x750x350	133

ESSV-I 3.200-250-02	250	165	170-260	800x750x350	140
ESSV-I 3.200-330-02	330	220	170-260	950x900x450	195
ESSV-I 3.200-415-02	415	270	170-260	950x900x450	198
ESSV-I 3.200-480-02	480	330	170-260	950x900x450	225

## SAFETY MEASURES AND WARNINGS

The servicing of the normalizer series ESSV-I must be realized with obligatory observing all requirements of accident prevention for the work with electric machines, and fulfilling all directions of the present manual.

The maintenance staff connected with switching on, exploitation, technical servicing of the normalizer must have access qualification level to works with voltage 1000 V not lower than IV. They must do works through work-permits or orders according to the rules of technical exploitation of customers' electric installations.

For switching on the normalizer, the supply network must have a device for circuit break of phase and zero supply wires.

### IT IS FORBIDDEN:

to store, install and exploit the normalizer in the rooms with explosive or chemically active environment, able to destroy metal and isolation materials, in rooms with construction waste and dust, near containers with highly inflammable liquids;

to switch and exploit the normalizer without arranging ground according to the requirements of rules of electrical facilities maintenance;

to use one and the same wire as ground and zero wire;

to exploit the normalizer if there are deformities of the details of the cabinet, if there is smoke or smell typical of burning isolation, if there is increased noise or vibration, damaged joints, vague fixation of automatic switches in temporary position;

to carry out any works connected with opening the cabinet without switching off the normalizer from the net;

to interfere with protection seal and make structure changes in the configuration of the normalizer;

to exploit the normalizer on the loads exceeding its passport characteristics; to

exploit the normalizer with the removed or open door of the cabinet;

to place alien objects on the surface outside and inside the cabinet;

to limit access to the normalizer which makes it impossible to open the door of the cabinet completely.

 **ATTENTION!**

The instructions presented below are placed on the inner side of the cabinet door of the normalizer.



## PREPARATION FOR WORK, SWITCHING ON AND INTRODUCTION INTO SERVICE

Before switching on the normalizer it is necessary to be sure that there are no mechanical breakages of its cabinet and interior components;

If transporting and storage were realized at negative temperatures of the environment, before the assemblage the normalizer should be kept in the place of installation for not less than 2 (two) hours to prevent the appearance of condensate;

to establish the normalizer on horizontal flat hard surface in the place designed for it, providing free access to the device for switching it and technical servicing;

the installation and introduction into service of the normalizer must be carried out by qualified staff with observing requirements of the technical passport, rules of electric facilities maintenance, rules of accident prevention, according to the connection diagram;

to perform the works safely it is necessary to switch off supply net;

before switching on, to ground the cabinet of the normalizer with a wire having a cross-section according to the rules of electric facilities maintenance, Chapter 1.7.126;

wire N, switched to the normalizer, must have the cross-section not less than 6 mm<sup>2</sup>;

the cross-section of power cable and ground wire is chosen in accordance with the size of nominal current on the basis of rules of electric facilities maintenance, Chapters 1.3.11, 1.7.126;

switch the commutation load device (protection automatic control, cutout) to the output terminal block "load 380V";

switch the supply net to the upper contacts of input automatic control QS "Net 380 V";

protection automatic control QA must be in the position "On";

energize the upper contacts of input automatic control QS "Net 380 V";

set the automatic control QA in the position "On";

set commutation automatic controls Q1, Q2, Q3, on the control board in the position "On";

in 1 (one) minute energize the load;

the process stabilization is confirmed by the green indication sign "Normalization" on the upper edge of the normalizer's cabinet.

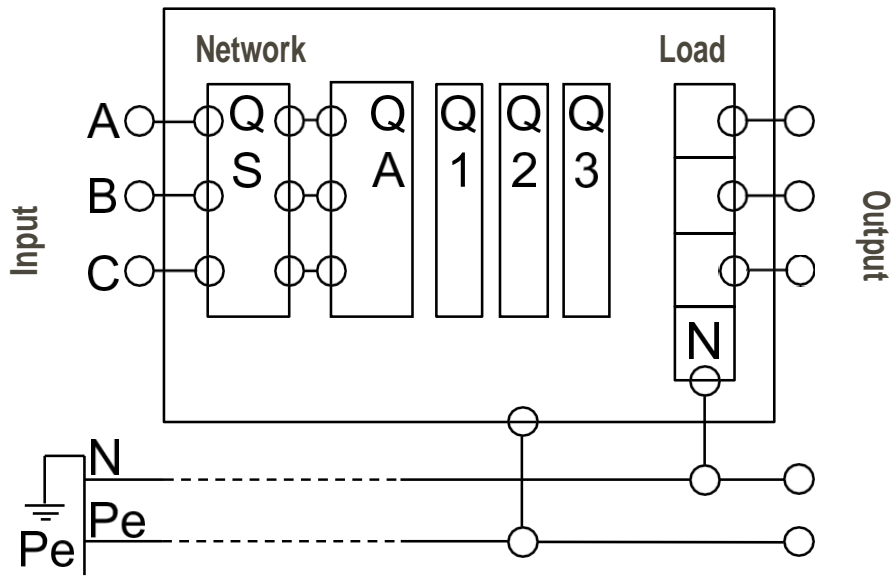


Fig.1 Plug in scheme

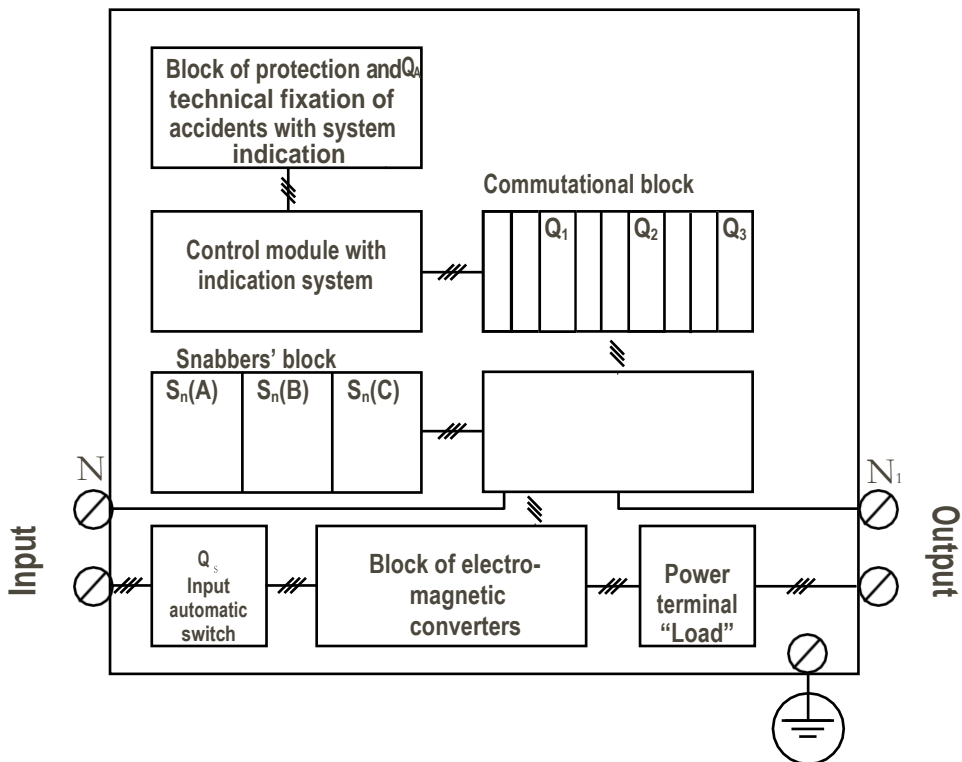


Fig.2 Circuit diagram of normalizer

## INTRODUCTION INTO SERVICE AFTER EMERGENCY OUTAGE OF AUTOMATIC EQUIPMENT

The cause of cutout of automatic switch QA, located in the upper left part of the control board, is any type of short circuit that happened on the periphery of the normalizer, or its overload exceeding passport characteristics.

The given mode is confirmed by the red indication "Emergency outage of automatic control" For the second introduction of the normalizer into service it is necessary to do the following:

Disconnect the power supply of the normalizer;

Set input automatic switch QS in the position "On"; Find

and eliminate the cause of the emergency cutout;

Measure the levels of isolation of the supply net and power customers;

Examine the interior part of the normalizer and make sure that no elements are damaged;

Switch off automatic switches Q1, Q2, Q3;

Switch on automatic switch QA;

Energize input automatic switch QS;

Switch on the automatic switch QS;

Switch on the automatic controls Q1, Q2, Q3; In 1

(one) minute energize the load;

the process stabilization is confirmed by the green indication sign "Normalization";

in 10 (ten) seconds after the normalizer begins to work in the operational mode switch on customers.

## TECHNICAL SERVICING

In the period of exploitation of the normalizer the maintenance staff must carry out technical servicing of the normalizer at least once in 6 (six) months, which includes the examination of the normalizer and the wires coming to it with the purpose of finding possible damages;

tightening power connection terminals;

removing dust and dirt from the surface of the normalizer with dry cleaning waste or a brush.

## **i** ATTENTION!

The use of abrasive materials, synthetic detergents, chemical solvents can lead to the damage of the surface of the cabinet, controls and indicators of the normalizer.  
Penetration of liquids or alien objects inside the normalizer can disable it.

## **RULES OF TRANSPORTATION AND STORAGE**

The transportation must be carried out in the package of the producer-enterprise by any type of land transport (in closed non-pressurized compartments), by river, sea, air (in closed pressurized departments) transport without limitations of distance and speed, admissible for the given type of transport.

The normalizer must be kept in the package of the producer- enterprise at the relative moisture of the air up to 90% in ventilated rooms in the absence in the air of acid vapors and gases harmful for materials.

## **PRODUCER'S GUARANTEES**

The producer-enterprise guarantees reliable work of the normalizer while meeting by customers the requirements of exploitation, transportation, storage given in the present manual.

Warranty period of the exploitation of the normalizer is 12 (twelve) months from the moment of sale. During the indicated period the producer-enterprise makes guarantee repair of the normalizer free of charge.

The guarantee repair is not produced in the following cases:

Non-observance of rules of storage, transportation, installation and exploitation, established by the present manual;

Breakage of the seals;

The presence on the cabinet of the normalizer of mechanical damages, traces of chemical substances and penetration of alien objects into the interior of the normalizer;

The repair of the normalizer by persons or organizations not authorized by the producer-enterprise, dismantling the normalizer and other actions and interferences not presupposed by the present manual.

At damages caused by force majeure circumstances (natural calamities, fires, lightning, etc.), the use other than intended.

The producer- enterprise does not pay for damage during the guarantee period through no fault of the enterprise.

The producer- enterprise does not bear responsibility for the damage to health and property if the damage was caused by non-observance of the norms of installation and exploitation established by the present manual.

The producer- enterprise reserves the right to carry out paid repair instead of the repair free of charge, notifying the customer, if after opening the normalizer the faults are found which appearance might be caused by penetration of liquid or alien objects inside; by exploitation of the normalizer in conditions of possible penetration of construction dust and dirt; by life activity of rodents and insects.

Strict observance of requirements and recommendations given in the present manual will provide reliable work of the normalizer.

## RECOMMENDATIONS ON ELIMINATING POSSIBLE FAULTS

Problems	Possible causes	Recommendations
1. Actuating input automatic switch QS	Short circuit of any type on the periphery of the normalizer series ESSV-I (load)	De-energize the normalizer, find and eliminate short circuit on its periphery (In load)
	Overload of the normalizer by more than 20%.	
2. Actuating switch QA on control board	Incorrect sequence of introducing the normalizer into service	Introduce into service according to the instruction on the interior side of the cabinet door
	Exceeding admissible impulse (starting) currents in load	In case of repeated actuating of protection switch QA in the process of the following exploitation, after the routine restart, specify the load parameters
3. Indicator "Net" on power block PS-1111 does not work	Absence of voltage on two phases coming to the power block PS-1111	Check commutation connections
4. Indicator "POWER" on control unit BVC-3x380-1003 does not work	Fault of power unit PS-1111	Check commutation connections
	Fault of control unit BVC-3x380-1003	Apply the service of technical support of the producer-enterprise*
5. The flickering indicator "work" on control block BVC 3x380-1003	Input voltage "came out" of operating range $170V \pm 2V \leq U_{oper} \leq 260V \pm 2V$	Correct levels of phase voltages on the side of power net by addressing the energy supplying organization
	Fault of control block BVC-3x380-1003	Address the service of technical support of the producer

Service of technical support\*:

Tel.: (383) 209-06-45, FAX: (383) 209-06-47, e-mail: info@normel.ru

Modes of phase-by-phase indication of control block (БУ ВVC-3x380-1003)

Phase	Visual reporting	Level of input phase voltage
1.Phase A	Red light of optical diode ⊗ U↑	$U_{\phi A} \geq 222 \text{ V} \pm 1 \text{ V}$
	Green light of optical diode ⊗ U↓	$U_{\phi A} \leq 210 \text{ V} \pm 1 \text{ V}$
	Both diodes do not work	$212 \text{ V} \pm 1 \text{ V} \leq U_{\phi A} \leq 222 \text{ V} \pm 1 \text{ V}$
Phases B and C work in a similar way		

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