SCIENTIFIC PRODUCTION ENTERPRISE

VIBROBIT LLC

427732

EQUIPMENT ‘VIBROBIT 300’

STAND СП43

Operation and Maintenance Manual

ВШПА.421412.336 РЭ

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The Operations and Maintenance Manual (OMM) is intended for familiarization of users (consumers) with the purpose and operation of the stand SP43.

The user must know the rules operation of electrical appliances, have experience with technology of radio, as well as to know the purpose and work equipment "VIBROBIT 300". you must use the following documentation for configuring and working with the control modules:

ВШПА.421412.300 И1 Equipment "Vibrobit 300". Instructions for setting up modules

ВШПА.421412.300 РЭ Equipment "Vibrobit 300". Operation and Maintenance Manual

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1 Description and operation

1.1 **Designated purpose of the stand СП43**

The stand is designed to set up and test the equipment status "VIBROBIT 300" at adjustment, installation and maintenance. The stand is used to test and calibrate:

- Control modules;
- БИ24 display unit;

The stand can be used VIBROBIT 300 as power supply units and switching means with metrology calibration equipment. Measuring equipment parameters are external instrumentation.

1.2 **Composition of a product**

- Stand СП43 1 pcs;
- Interconnecting cable СП43 – БИ24 1 pcs;
- Power network cable 1 pcs.

1.3 **Technical characteristics**

1.3.1 Basic technical descriptions of stand of SP43 are indicated in a table 1.

Table 1

Name of parameter	Norma
Types of output variable signal of generator of PG10	Harmonic, meandr
Range of the set frequencies of generator of PG10, Hz	From 0.01 to 10000 inclusive
Range of regulation of variable the constituent of output signal of generator of PG10, V	From 0 to 2 inclusive
Ranges of regulation of permanent constituent of output signal of generator of PG10, V	From 0 to –11 inclusive From 0 to 11 inclusive.
Supply voltage an alternating current with a frequency of 50 Hz, V	220 ±22
Overall dimensions, mm	264x287x149
Weight, kg no more	3

1.3.2 Stand keeps its characteristics

– at a temperature from plus 5 to plus 50 ^{0}C

– at a temperature of 35 ^{0}C at a relative humidity of up to 80% without condensation moisture.

1.3.3 Time of readiness (warming up) does not exceed 10 minutes.

1.3.4 Electrical Insulation resistance at 220 V circuits, min:

– 40 Mohm - under normal operating conditions

– 2 Mohm – at a temperature of 35 ^{0} C and relative humidity of 80%.

Insulation of electrical circuits with a voltage of 220V can withstand 0.9 kV test voltage for one minute e.

1.3.5 Voltage industrial interference, dBuV, not more:

– at frequencies from 0.15 to 0.5 Hz 80

– at frequencies from 0.5 to 2.5 MHz 74

– at frequencies from 2.5 to 30 MHz 60

1.3.6 The average term of the stand service - 10 years.

1.4 **Stand principle of operation and description**

The stand includes a switching device, which is produced using switching signals and check the characteristics of the equipment control modules "VIBROBIT 300", through internal or external measuring devices. To configure the modules you need to use the diagnostic interface module MS01 USB (MC01 RS232) and computer c appropriate software or of the Service Technician Device ПН31.

1.4.1 Structurally, the stand is in the subrack 19 " and consists of:

– БП17 power supply unit;

– the dashboard;

– ПГ10 generator.

The power supply unit of БП17 is a source of supply voltages of the stand and the checked devices. The instrument board is intended for switching of input and output signals of the checked modules, and the PG10 generator – for the job of input signals of modules control.

1.4.2 Adjusting elements are arranged on the panel in accordance with Annex B.

Assignments of controls and information are specified in table 2.

Table 2

Controls and Information	Assignment
Power supply unit БП17	
Toggle-switch «POWER»	Turning on stand
Toggle-switch «INPUT»	Set to «OK»
Fuse link «1A»	Fuse primary circuit **(Caution 220V)**;
Illuminated indicator «$\overline{\text{OK}}$ SYS»	fault Display БП17
Illuminated indicators «+15V», «–15V», «+24V»	Showing availability of appropriate voltages
Dashboard	
Toggle-switch «Фильтр»	Switching on and off the internal filter constant component of the signal
Toggle-switch «Синхро»	Selection of internal / external synchronization signal
Toggle-switch «Нагрузка»	Switching on and off internal load to set the DC component of the signal
Toggle-switch «Смещение»	Switching on and off DC bias signal
Toggle-switch «Сигнал»	Selection of signal inside / outside
Switch «Вход №»	Input selection checked control module
Switch «Выход №»	Selecting of the checked unified current output control module
Adjustment «Амплитуда»	Adjusting the DC bias signal amplitude.
Socket coupler «RS485»	The RS485 interface of the checked module
Jack «Тест 1»	Connection of the milliamperemeter
Jack «Тест 2»	Connection of the voltmeter
Jack «Тест 3»	Connection of a frequency meter
Jack «Синхро»	Jack for external synchronization signal
Jack «Выход»	Jack for analog output
Jack «Вход»	Jack Jack for external input
Jack «+24V»	Output voltage +24 V

Continuation of Table 2

Controls and Information	Assignment
Jack «+15V»	Output voltage +15 V
Jack «⊥»	Outputs common wire
Illuminated indicators «1», «2», «3», «4», «5», «6», «7», «8», «9», «10», «11», «12»	Displaying the active state of the logical outputs of the control modules.
Generator ПГ10	
Switch «ЧАСТОТА»	«0,05Гц», «20Гц», «45Гц», «80Гц» – installation of the corresponding fixed values of frequency of an output signal; «x1»…«x10^3» – installation of a multiplier of frequency of an output signal from x1 до x10^3.
Adjustment «ЧАСТОТА»	Smooth adjustment of frequency of an output signal from 1 to 10 Hz
Adjustment «~U»	Setting the variable component of the output signal.
Adjustment «=U»	Setting the DC component of the output signal.
Toggle-switch «⩘» / «⊓⊔»	Selection of the output waveform.
Toggle-switch «+» / «–»	Choice of a sign of a DC component of an output signal.
Jack «ВЫХ»	The output signal is generated.
Jack « ⊥ »	Output common wire.
Illuminated indicator «OK»	Display of operation of the generator.
Back board	
Socket coupler «CAN2.0B»	The CAN2.0B interface of the checked module
Socket coupler «~220В»	Connecting the power cord of SP43

2 Intended use

2.1 **Safety measures**

– Terminal " ⏚ ", located on the rear panel of the stand, connect to the ground bus.

– By the operation of the stand prevent persons having third and higher group on electrical safety.

2.2 **Operation procedure**

Remove the cap and connect the checked module, to make the necessary switch. To turn on the stand, having installed the POWER toggle-switch in the situation "ON". Having warmed up the stand and the checked device, to make calibration or check of the module

2.2.1 Actions performed to check and calibrate the control module using the internal test signals booth SP43 (with PG10 board generator):

– Toggle-switch «Фильтр» set to “OFF”;

– Toggle-switch «Синхро» set to “внутр.”;

– Toggle-switch «Нагрузка» set to “OFF”;

– Toggle-switch «Смещение» y set to “OFF”;

– Toggle-switch «Сигнал» set to “внутр.”.

2.2.2 Actions performed to check and calibrate the of measuring channels control module with an external generator test signals:

– Toggle-switch «Синхро» set to “внешн.”;

– Toggle-switch «Сигнал» set to “внешн.”;

– Connect the signal generator «∿» to the jack «Вход» и «⊥»;

– Connect the signal generator «⊓» to the jack «Синхро» и «⊥»;

– Set toggle-switches «Фильтр», «Нагрузка», «Смещение» set to “OFF”.

2.2.2.1 If an external generator does not allow to set a constant bias of the test signal:

– Set Toggle-switches «Фильтр», «Нагрузка», «Смещение» set to “ ON ”;

– Connect DC voltmeter, cl. 0.6 to jacks «Тест 2» и «⊥»;

– DC bias signal level adjust knob «Амплитуда».

2.2.3 Actions performed to check and calibrate the of measuring channels control module on a DC current:

– Connect DC voltmeter, cl. 0.6 to jacks «Тест 2» и «⊥»;

– Select number of the checked channel to produce a switch «Вход №»;

– Generator ПГ10 toggle-switch Set «∿» / «⊓» set to «∿»;

– Knob «~U» generator ПГ10 to set the minimum level of the input AC voltage (left end position);

– The level of the input DC voltage control module to adjust the knob «=U» generator ПГ10.

2.2.4 Actions performed to check and calibrate the of measuring channels control module on a AC current:

– Generator ПГ10 toggle-switch Set «⎍» / «⎓» set to «⎍»;

– Connect DC voltmeter, cl. 0.6 to jacks «Тест 2» и «⊥»;

– Connect a voltmeter AC impedance at least 1 Mohm, cl. 0.6 jacks to "Test 3" and «⊥»;

– Connect milliamperemeter DC cl. 0.2 jacks to «Выход» и «⊥»;

– Select number of the checked channel to produce a switch «Вход №»;

– The level of the input AC voltage control module to adjust the knob «~U» generator ПГ10;

– The level of the input DC voltage control module to adjust the knob «=U» generator ПГ10.

– Input signal frequency control module to adjust the knob «Частота» generator ПГ10.

2.2.5 Actions performed to check and calibrate of unified outputs control modules:

– Apply a test signal to the inputs of the control module, one of the ways mentioned above, according to the type of custom module;

– Connect milliamperemeter DC cl. 0.2 jacks to «Выход» и «⊥»;

– Select number of unified current output to produce a switch « Выход №»;

2.2.6 Actions performed to check and calibrate of the display unit БИ24:

– Connect БИ24 display unit to the CAN2.0B socket located on the back board SP43 stand with a cable connecting SP43 - BI24;

– To connect obviously serviceable module of control which is adjusted for work with the checked of display unit БИ24;

– To check or adjust operation of display unit.

3 Maintenance

- Routine repair shall be conducted when a certain malfunction of the stand..
- Checking stand is held annually.

3.1 **Routine repairs**

3.1.1 To perform all works on repair of the stand at the disconnected network cable.

3.1.2 Routine repair conducted by replacing the faulty units – of the power supply unit БП17 (ВШПА.421412.136) and of the generator ПГ10 (ВШПА.421412.098).

3.2 **Periodical check of characteristics of the stand**

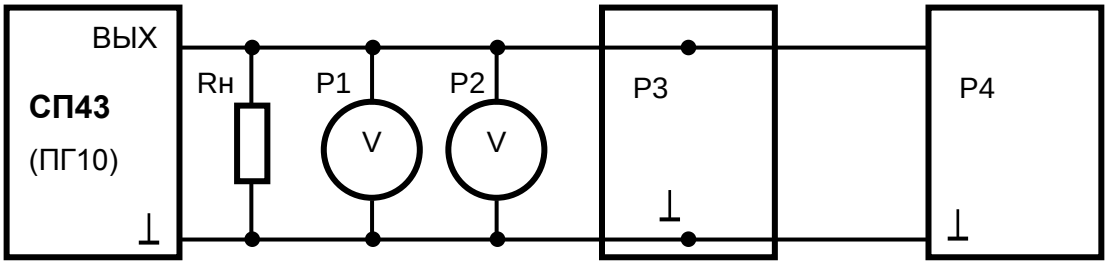
3.2.1 The checked stand, means of check, and also the service equipment have to be connected to the ground bus.

3.2.2 Check of the БП17 power unit is carried out according to TU 4277 – 001 – 27172678 – 12.

3.2.3 Check of the generator ПГ10 is made in the composition of the joint venture stand СП43 at the previously-tested card БП17 power supply unit.

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3.2.4 Rig up the circuit by referring to Figure 1.



Rн – load resistor 510 ± 5 % ohm, 0.25 W;

P1 – DC voltmeter, cl. 0.6;

P2 – AC voltmeter, cl. 0.6;

P3 – frequency counter;

P4 – oscilloscope.

Figure 1

Check the characteristics of the generator ПГ10, shown in Table 1.

The ПГ10 generator is considered passed checking ,if the waveform and range of adjustable parameters correspond to Table 1.

3.2.5 During the check the following conditions must be met:

- Ambient air temperature plus (20±5) °C;
- Relative air humidity from 30 to 80 %;
- Atmospheric pressure 650 - 800 mmHg (86 - 106,7 kPa);
- Absence of vibration, external magnetic fields.

3.2.6 Recommended list of the control and measuring equipment used when checking is provided in the table A.1.

4 Transportation and Storage

4.1 Packaged the СП43 stand may be transported to any distances by railway or road (in enclosed bodies of the vehicles), by see (in holds), by air (in pressurized compartments).

Transport conditions– Ж as per GOST 25804.4–83.

4.2 Packaged the СП43 stand is designed to withtest rig the following transit conditions:

- temperature – from minus 50 °C to plus 50 °C;
- relative humidity – 95 % at 35 °C;
- vibration (acting alone the three mutually perpendicular axes of the container) when carried by railway, motor vehicle and aircraft within the range of frequencies (10 – 55) Hz at the amplitude of the vibratory displacement of 0.35 mm and vibratory acceleration of 5g;
- impacts with the shock acceleration peak value 10g, shock pulse duration 10 ms, number of impacts (1000 ± 10) in the direction indicated by the arrow applied on the container.

4.3 The СП43 stand storage conditions with regard to the impact of the environment must comply with the conditions 3 (Ж3) as per GOST 15150–69. Warranty period of storage shall not exceed 24 months from the date of manufacture.

4.4 Long-term storage of the СП43 stand shall be carried out in the packaging material inside the heated premises meeting the requirements specified in 1 (Л) as per GOST 15150–69.

Annex A

(Informative)

Recommended list of the control and measuring equipment

Table A.1

Name, type	Designation, GOST, TU	Technical characteristic	Qty
Voltmeter В7-40, В7-43	GOST 14014-91	cl. 0.6	2
Voltmeter М2044	GOST 8711-93	0 – 10 V; 0 – 20 mA cl. 0.2	2
Generator Г3-110,Г3-122			1
Generator Г5-60			1
Frequency counter Ч3 - 63			1
Oscilloscope С1-96			1

Annex B

(Informative)

Appearance of the stand СП43

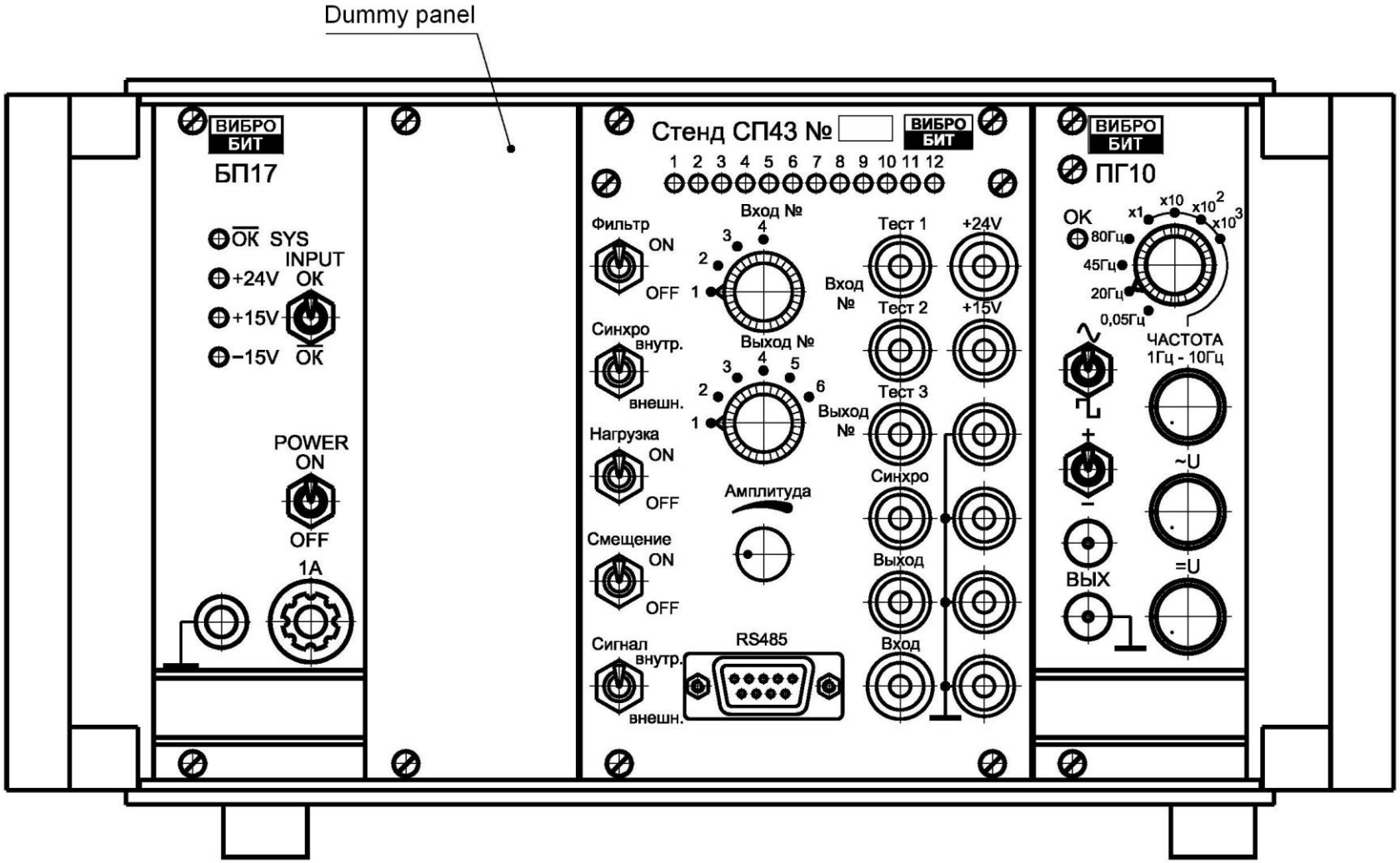


Figure B.1

Shematic circuit diagram of the stand СП43

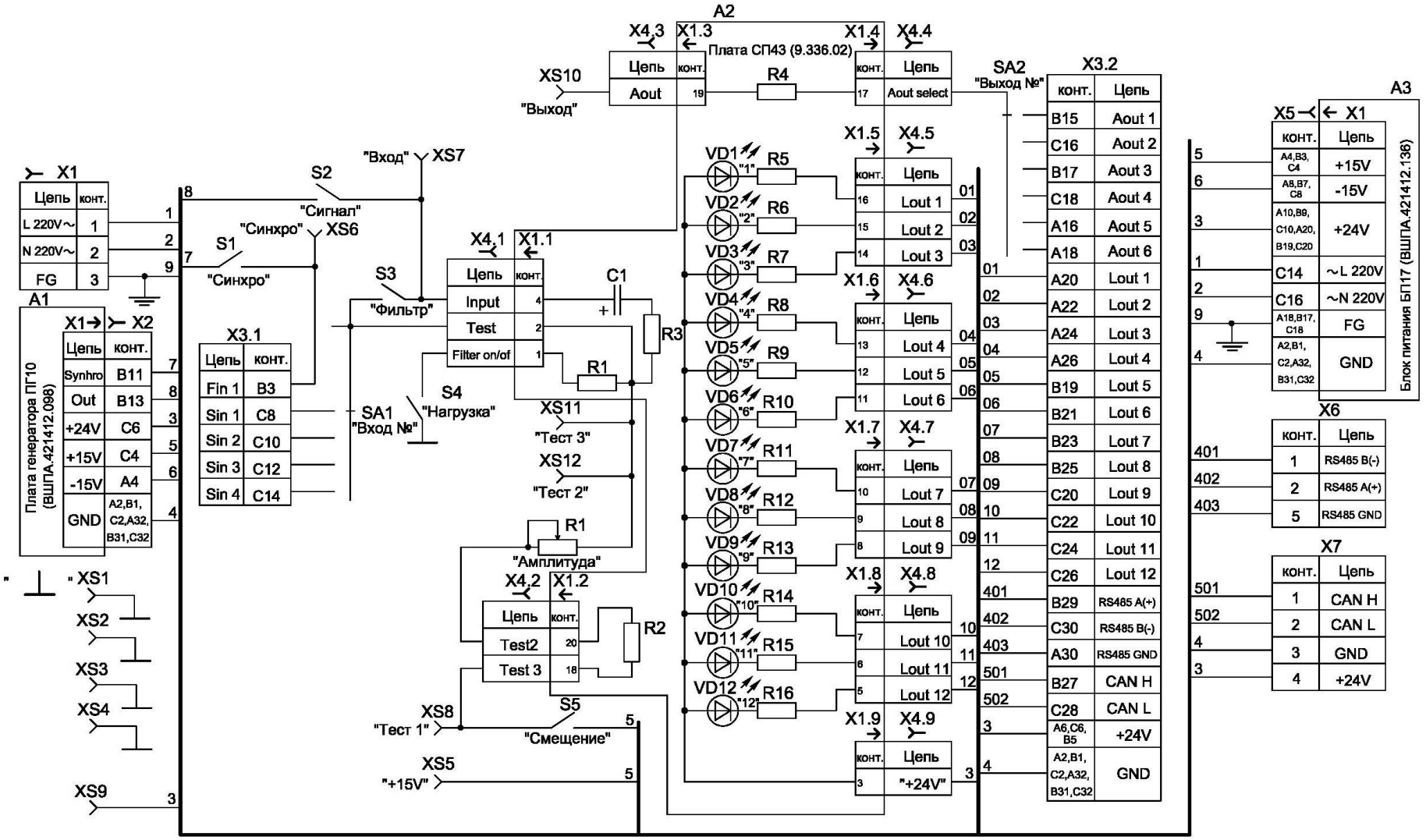


Figure B.2

Notes