



# UPES-50A

## Analog 4-20mA Multi-Channel Controller

### Operating Manual



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## Designation

UPES-50A (hereinafter – UPES) is designed to operate with primary detectors via 4-20mA unified analog signals. The input signal exceedance of the set threshold levels is controlled by audible and LED alarms as well as connected peripheral devices via relay outputs for RS-485 interface transmission of all channel data in Modbus RTU protocol format.

UPES is installed outside the explosion hazard zone and shall be operated at temperatures from - 10 to 45 °C and relative ambient air humidity up to 95% at 35°C.

UPES-50A functional capabilities enable to power up to 16 primary detectors:

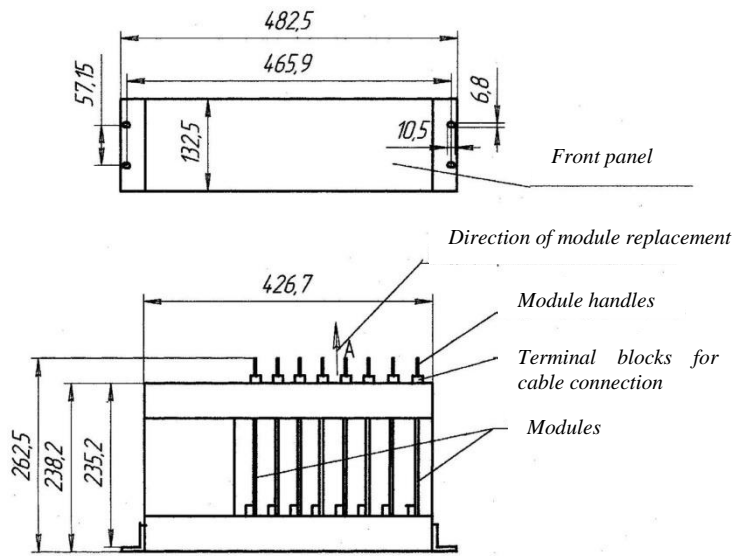
- SGOES
- SGOES-M
- SGOES-M11
- SGOES-2
- SGOES-M-2
- SGOES-M11-2
- SSS-903
- SSS-903M
- SSS-903ME
- IPES IR/UV
- IPES IKM
- VECTOR FCU

## 1. Basic Specifications

Table 1. Basic Specifications

Relative humidity at temperature 35 °C, %	up to 95	
Ambient temperature range	from -10 up to +45 °C	
Input voltage range with various power supply units	power supply unit of BP-1 design	187-242 V 50 Hz (main power) or direct current with voltage 18-32 V (backup power)
	power supply unit of BP-10 design	130-242 V 50 Hz (main power) or direct current with voltage 180-340 V (backup power)
UPES power from DC power supply with voltage not more than, V	24	
UPES commutated current at AC voltage 220 V, A	up to 3	
Length, mm	266	
Width, mm	482	
Height, mm	132	
Weight, kg, not more than	17	
Ingress protection acc. to GOST 14254-96	IP54	

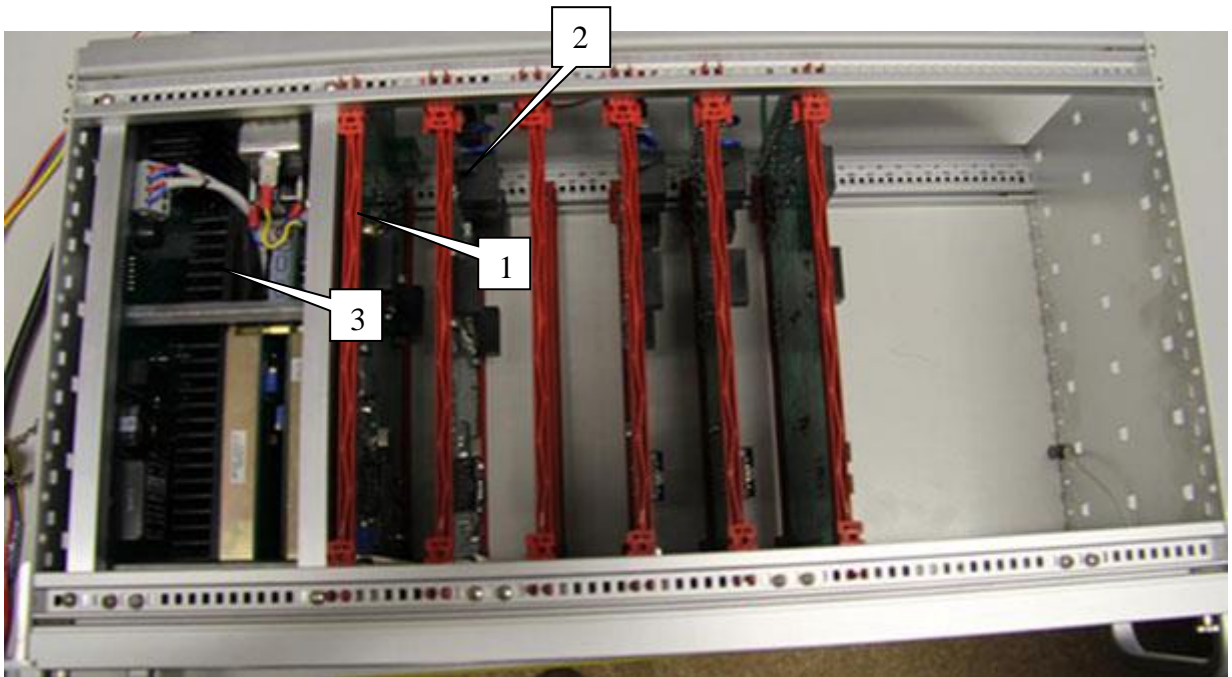
Fig. 1. UPES dimensions



*UPES control panel is designed as a standard 3U19"- type unit to be mounted in a rack*

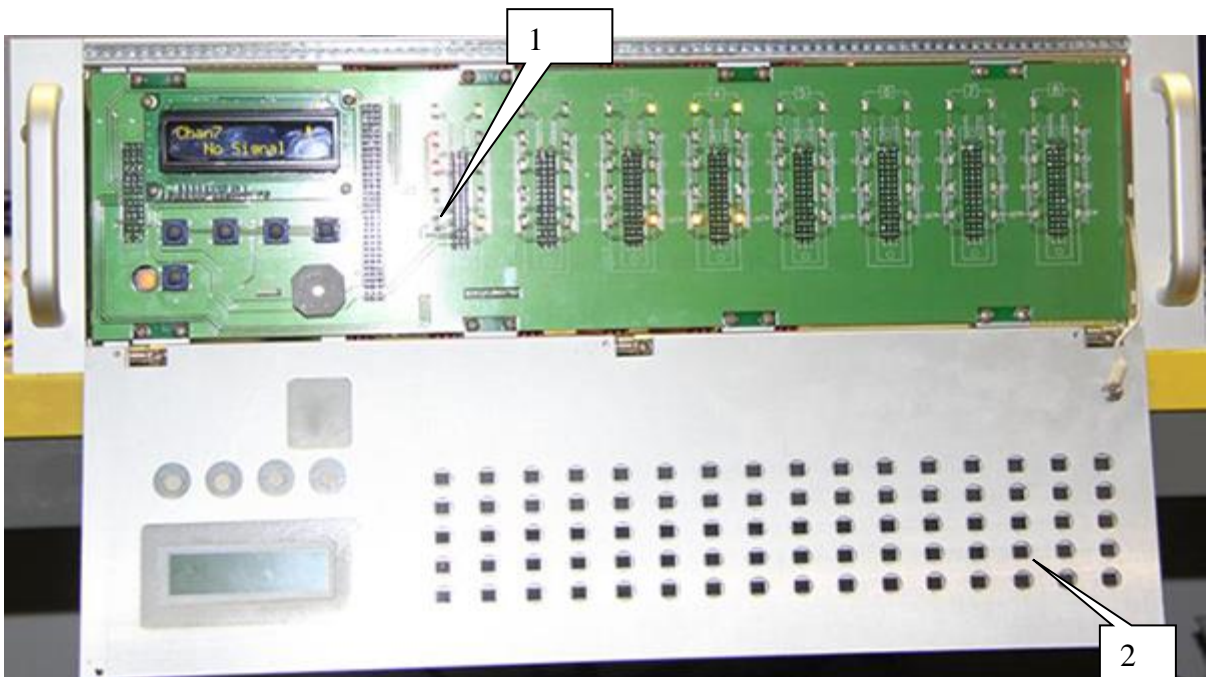
## 2. UPES Device

Fig.2. UPES Device



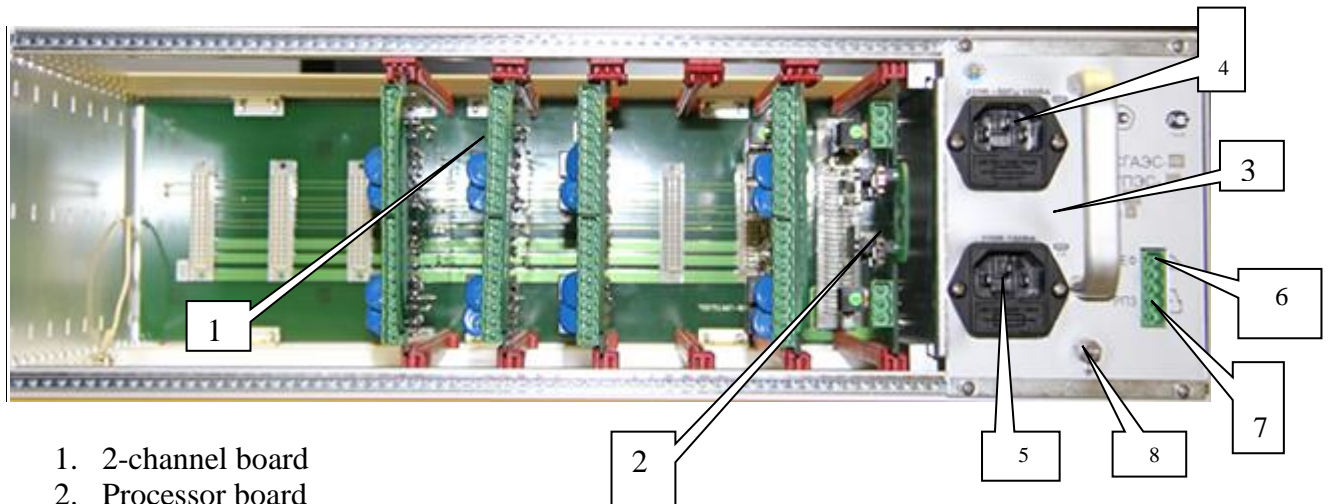
1. CPU board
2. 8 channel boards with 2 communications lines 4-20 mA
3. Power supply unit

Fig.2.1. Front View



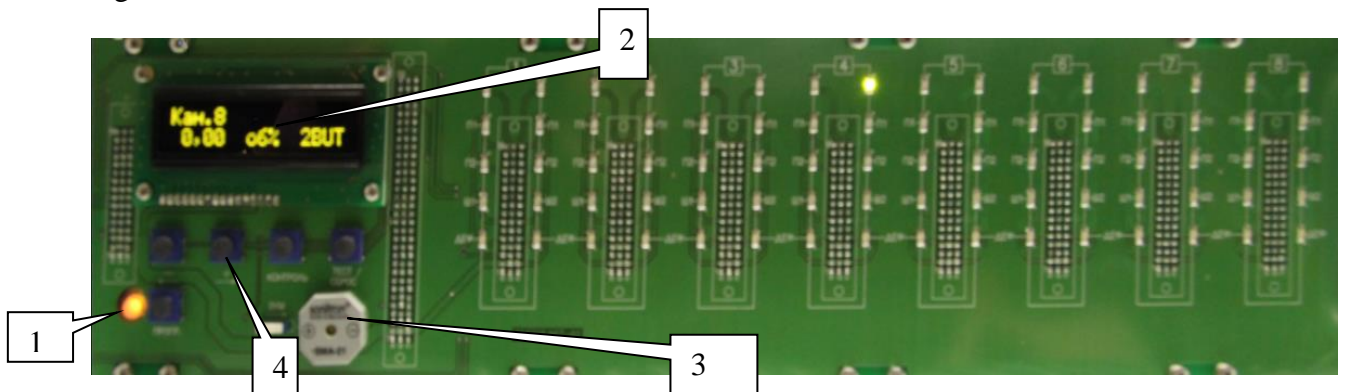
1. Interconnection board
2. Blind panel

Fig. 2.2. UPES Rear View



1. 2-channel board
2. Processor board
3. Power supply unit
4. Main power socket, 220V input voltage
5. Backup power socket, 220V input voltage.
6. Fault relay
7. Third threshold relay
8. Ground terminal

Fig.2.3. Interconnection Board



- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. UPES ON/OFF button</li> <li>2. LED display</li> </ol> | <ol style="list-style-type: none"> <li>3. Buzzer</li> <li>4. Keyboard</li> </ol> |
|---|--|

Each channel of the threshold device has a corresponding LED group:

- 1 green – the channel is ON;
- 3 red – the set thresholds are exceeded;
- 1 yellow – the channel is defective.

Moreover, in case of concentrations of any threshold of any channel are exceeded, an audible alarm, which is built in UPES, is activated.



### 3. UPES Operation Modes with IPES Fire Detectors and Gas Detectors Connected

#### 4.1 UPES operation modes with IPES connected

When operating with IPES fire detector, UPES indicator displays the following messages depending on the value of primary detector analog output:

- Signal  $2\pm 0.1$  mA – “Fault” message is displayed;
- Signal  $4\pm 0.1$  mA – “Norma” message is displayed;
- Signal  $18\pm 0.1$  mA – “Fire” message is displayed.

Fig. 3. UPES standby mode with IPES connected



Fig. 3.1. Fire indication accompanied by audible alarm.





Fig. 3.2 IPES fault (dust condition), UPES indication fault display. Accompanied by audible alarm.



Fig. 3.3 When a magnet key is brought next to IPES, the device becomes faulty. UPES display indication is accompanied by audible alarm.



Fig. 3.4. UPES indication in case of loss of communication with IPES. Accompanied by audible alarm.



## 4.2 UPES operation modes of with gas detector connected

When operating with gas detectors, UPES indicator displays the following messages depending on the value of primary detector analog output:

- Signal from 0 mA to 1.8 mA – “No Signal” message is displayed;
- Signal from 1.8 mA to 2.2 mA – “Fault” message is displayed;
- Signal from 2.2 mA to 3.5 mA – “Need Calibration”;
- Signal from 3.5 mA to 4 mA – measured concentration value 0;
- Signal from 4 mA to 23 mA – measured concentration value;
- Signal from 23 mA to 24 mA – “Excess Over” message is displayed;

Fig.4. UPES-50A and gas detector standby mode



Fig.4.1. “No Signal” indication. Accompanied by audible alarm



Fig. 4.2. “Fault” indication. Accompanied by audible alarm



Fig. 4.3. “Need Calibration” indication. Accompanied by audible alarm



Fig. 4.4 Measured concentration values (accompanied by audible alarm):

- 1) Excess of the first threshold



2) Excess of the second threshold



3) Excess of the third threshold



Fig. 4.5 “Excess Over” indication. Accompanied by audible alarm



When the first, second and third thresholds are exceeded, RL1, RL2, RL3 relays are triggered with a delay (installed at the request of the customer) after activation of P1, P2 and P3 LEDs. RL1 and RL2 relay contacts are output to spiral terminal connectors, located on each measurement unit. RL3 relay is common to all 16 channels. Its normally closed and normally open "dry" contacts are output to the spiral terminal connector at the rear of the control panel power supply unit and have the “RL3” inscription.

In case of failure of one or more channels (communication line break, short-circuit, negative-going signal), the fault relay is activated. Its contacts are output to the spiral terminal connector at the rear of the control panel power supply unit (inscription “DEF”). If a malfunction occurs in at least one channel, the relay is activated and the contacts get open.

#### **4. Pre-starting Procedure**

5.1 Prior to installation it is necessary to perform visual inspection. Pay attention to the following:

- 1) signs of damages;
- 2) availability of all fixture elements;
- 3) availability of grounding devices.

5.2 Installation shall be performed in accordance with a duly established project of onsite allocation pursuant to the installation diagram with due account for threshold device design. When performing installation, consider the following:

- 1) Electrical Installation Regulations
- 2) Regulations on Consumer Electrical Installation Operation
- 3) Safety Regulations on Consumer Electrical Installation Operation
- 4) This manual.

5.3 In order to connect UPES to a personal computer via RS-485 communication channel, it is possible to use any shielded twisted pair. In this case, signal wires are connected to contacts “485A” and “485B”, and the shield is connected to contact “GND”, located at the terminal block on the controller module rear side. 6.4 In order to connect UPES to the network and external actuation and signaling devices, it is possible to use any cables, cords or wires rated for operational voltage and current specified in this OM.

5.5 UPES shall be grounded by means of a screw clamp located at the bottom of the power unit rear wall. Upon completion of installation, check the following: - insulation resistance, which shall be not less than 0.5 MOhm; - grounding device resistance, which shall be not less than 4Ohm.

5.6 When installing UPES, provide free space above and under it in a rack with height not less than the threshold device height (132 mm).



## 5. Operating Procedure

6.1 Switch the threshold device to the mains and check its operability. To do this, loosen two screws on the top of the UPES face panel, turn the face panel down and push ON button.

6.2 UPES has three operation modes: test, normal indication and programming.

6.2.1 The test mode is implemented automatically upon each activation of the device as well as when the operator pushes the “TEST/RESET” button. The test takes about 30 seconds. Upon this, in the upper line of the indicator words “AUTOTEST” and “ELECTRONSTANDART” are alternatively displayed, and in the bottom line software version is displayed; “Def”, “II1”, “II2”, “II3” LEDs blink and the buzzer gives a continuous sound. The operator can stop the test mode by pushing the “CONTR” button. In this case the device is switched to the normal indication mode.

6.2.2 When in the normal indication mode, “Channel \*\*” is displayed in the upper line of the indicator, while in the lower line the following is displayed: gas concentration in units: “LEL” or “mg” or “%” or “ppm” and name of the measured gas (CH<sub>4</sub>, CO, H<sub>2</sub>S, NO, NO<sub>2</sub>, SO<sub>2</sub>, Cl<sub>2</sub>, H<sub>2</sub>, HCl, CO<sub>2</sub>, C<sub>4</sub>H<sub>10</sub>, C<sub>3</sub>H<sub>8</sub>, C<sub>2</sub>H<sub>2</sub> etc.). If in the normal indication mode a signal in any channel does not exceed the first threshold, in ~10 seconds an automatic polling of the channels is performed. When flame detectors are connected, the word “Channel \*\*,” is displayed in the upper line of the indicator, and on the bottom line “Norm” is displayed. If a signal in one or several channels exceeds the signal corresponding to the first threshold or is less than ~2.0mA (which corresponds to breakage or short circuit in the measuring channel), only this channels are automatically polled.

6.2.3 The channel number is selected by using buttons “+” and “-“, the indication number of this channel is stored in the indicator during 1 min, then in 10 sec an automatic polling takes place.

Check of UPES operation with available reserve power source

To switch UPES, push (and hold within 2 sec) the ON button on the front panel of the device after main and reserve power voltage is supplied.

The power supply unit controls output voltages of primary power detector and their absorbed current as well as controls voltages of all secondary power sources that shall be within the prescribed limits. In case any of the parameters goes beyond the prescribed limits, red light indication on the UPES front panel and audible alarm are activated and 24 V power dump takes place.

The power supply unit intactness control system has an individual secondary power source and a 5V reserve source with rated operation time of up to 30 seconds. If the main and reserve power

are available and no failures are detected as well as if UPES is powered ON, no sound signal is given and the ON button light up in green continuous light.

If the button illumination LED blinks with any color at frequency 1 Hz, it means that the power supply unit is OFF.

If the button illumination LED blinks with red color at frequency 1 Hz, it means that the power supply unit is OFF due to power unit failure or overload of secondary power supply units.

If the button illumination LED blinks with yellow color at frequency 1 Hz, it means that the power supply unit is OFF, but one of the input voltages (reserve or main) is not available.

If the button illumination LED glows in a continuous manner (any color), it means that the power supply unit is ON.

If the button illumination LED glows in a continuous manner (yellow color), it means that the power supply unit is ON, but one of the input voltages (reserve or main) is not available. When the power unit operates from the reserve source, short sound signals at frequency 1 Hz are emitted.

In all modes, connection or disconnection of any input voltage is announced by one sound signal, which last for 1 sec.

Table 2. Indication of ЖСКФ.436231.010 power unit operation modes

Mode of indication	UPES power status
UPES ON button blinks green	UPES is not switched on
UPES ON button blinks yellow	UPES is not switched on One of 220V input voltages is not available
UPES ON button glows green	UPES is switched on. Power voltages (main and reserve) are connected and are OK. Output voltages of primary detectors are OK. Output voltages of secondary detectors are OK.
UPES ON button glows yellow Short sound signals are emitted once per second	UPES is switched on. Power from reserve power source 220V
UPES ON button glows yellow No sound signals	UPES is switched on. Power from primary power source 220V

In all modes, connection or disconnection of input voltages is announced by one sound signal of 1 sec.

To install the face panel and tighten the loosen screws.

## 6. Channel Parameters. Working with Menu

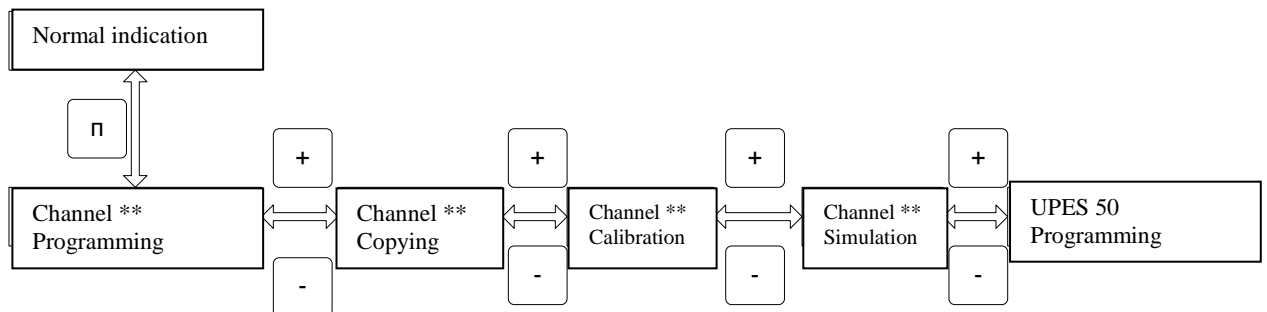
Push “PROGR.” in the bottom (UPES) – the user can view current values of channel parameters for the requested time.

### Flow-chart of the selected menu:

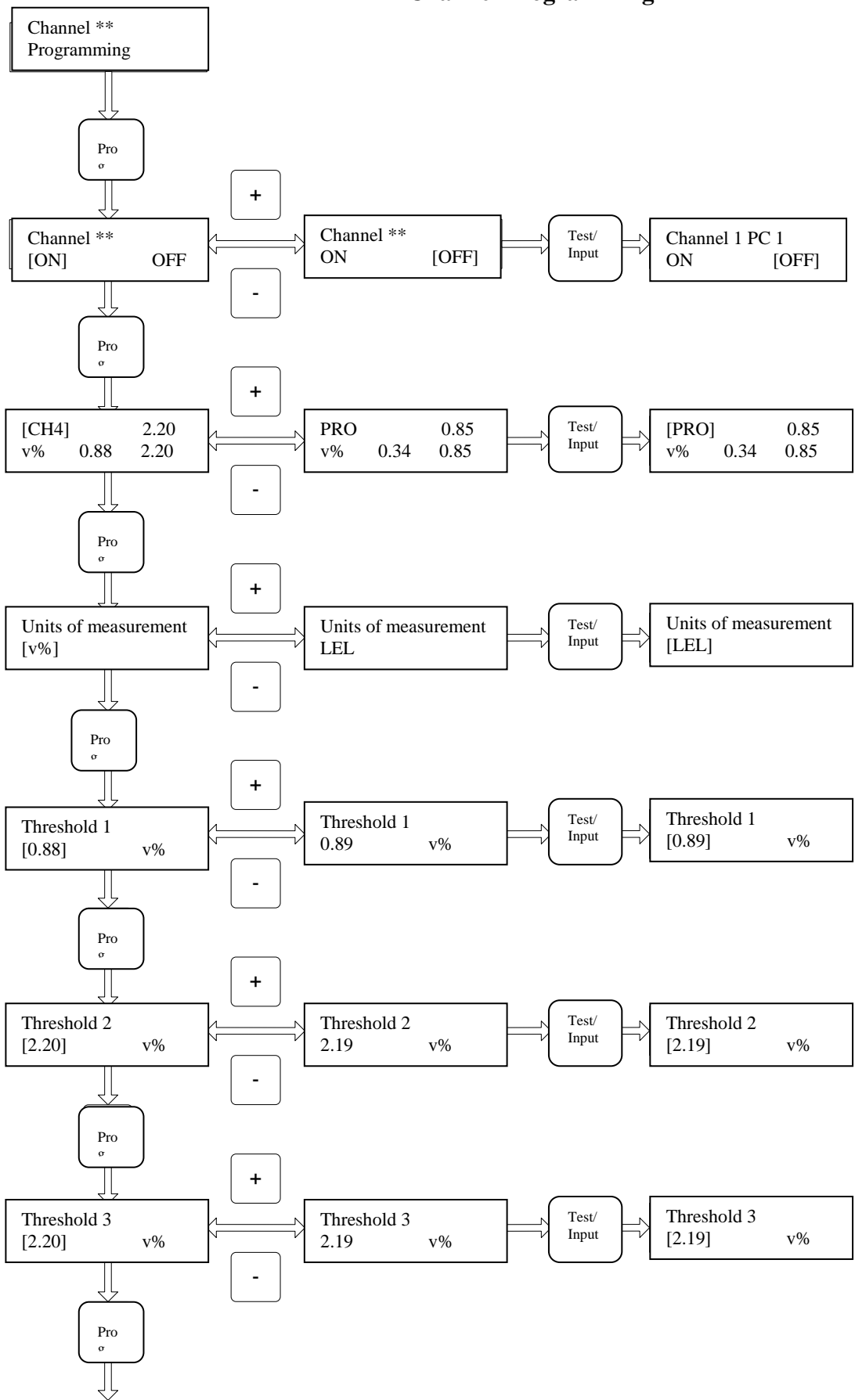
The device can be programmed via five menus:

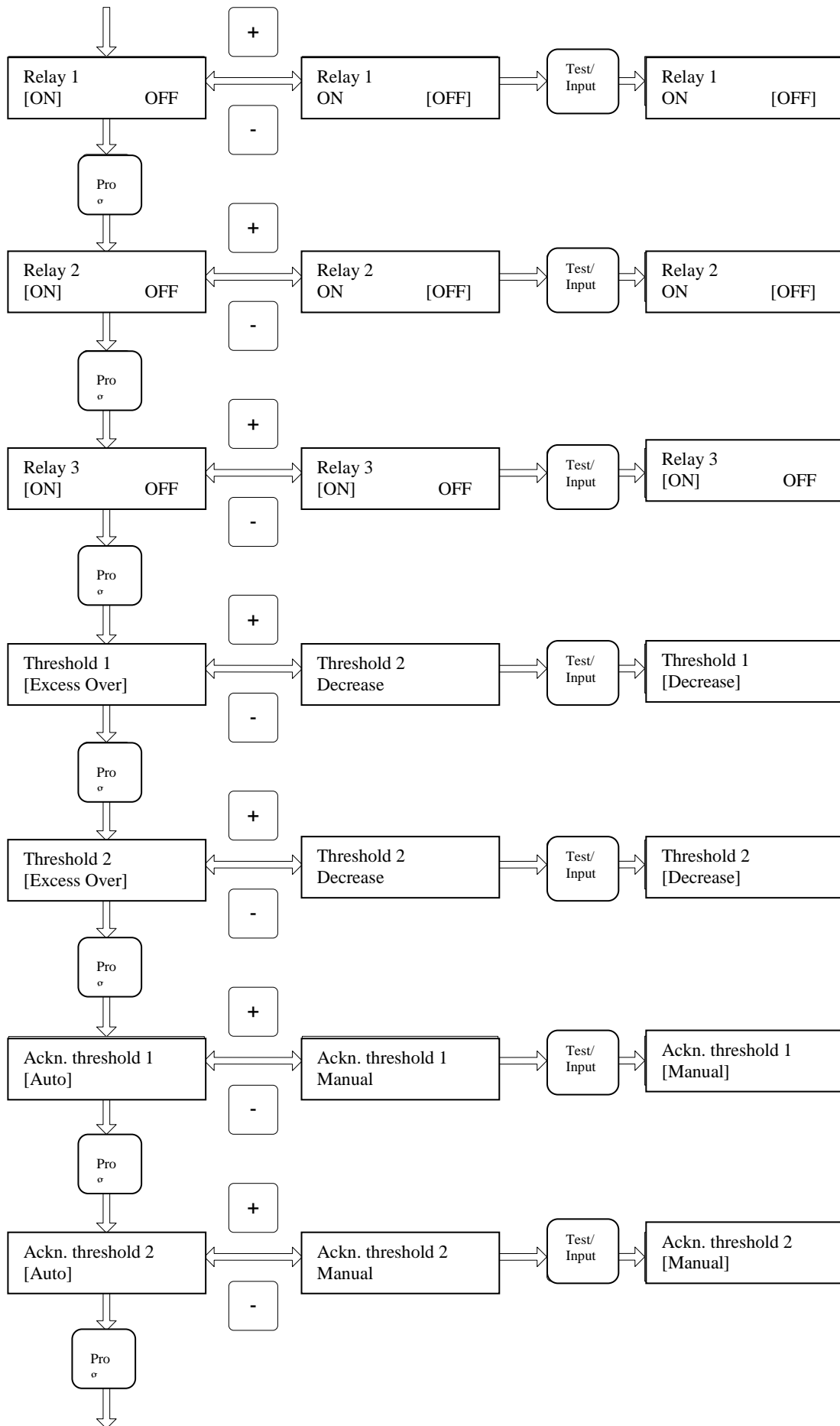
- channel programming;
- simulation programming;
- calibration programming;
- device copying;
- device programming.

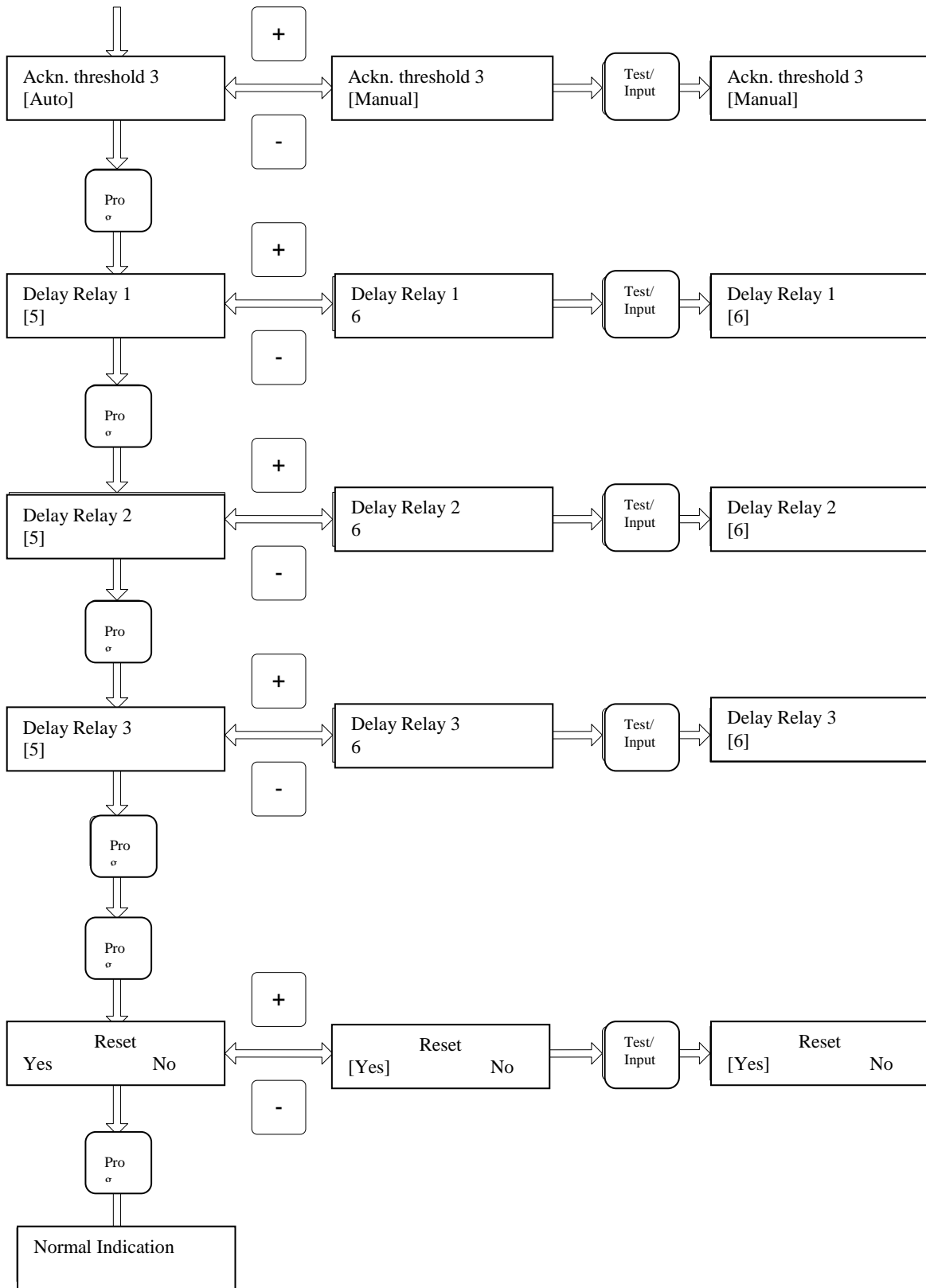
The required menu is selected according to a cyclogram.



## Channel Programming

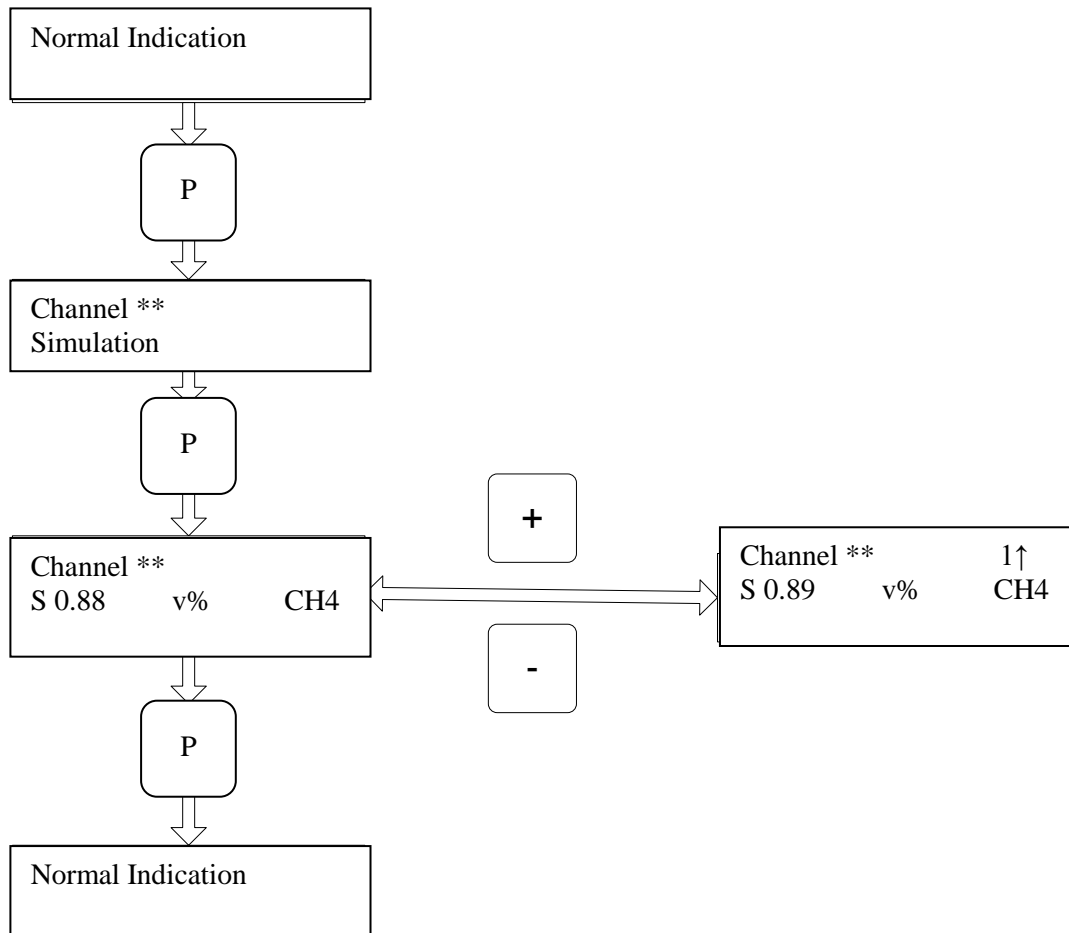






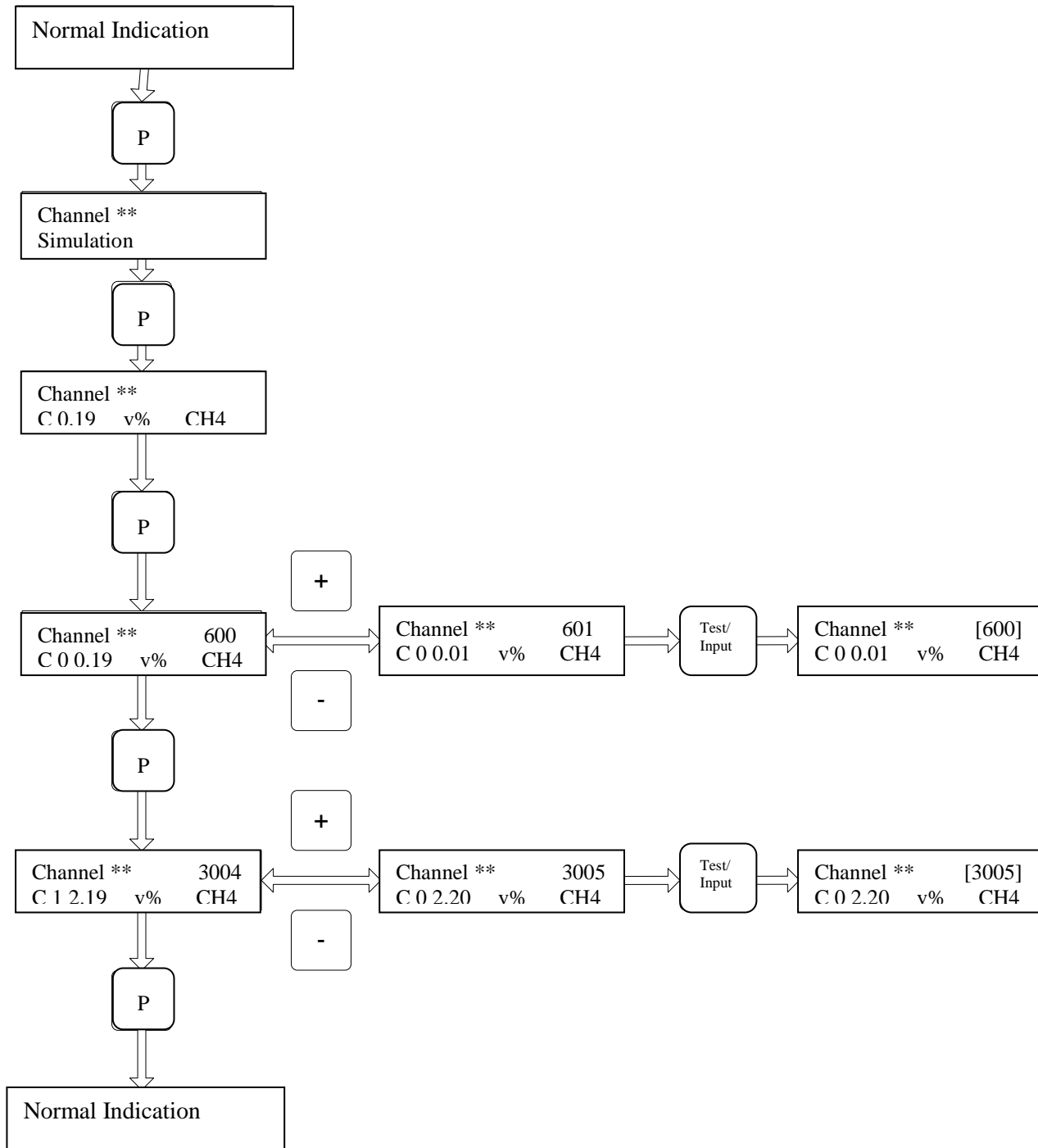


## Programming of Channel Operation Simulation Mode



The menu of channel operation simulation enables to test operation of light and audible alarm and channel relays in case of threshold activation. Select menu “Channel x Simulation”. Press button “PROG” The channel will go to the simulation mode. Use the “+” and “-” buttons to set the desired concentration value and monitor actuation of the light and audible alarm of thresholds and relays upon exceeding of threshold concentration (the threshold is set for actuation in case of exceeding threshold value concentration) or decrease in threshold concentration (the threshold is set for actuation in case of decrease in threshold value concentration). The set concentration value varies in the range from the lower limit of the measured sensor range to the upper limit of the measured sensor range + (upper limit of the measured sensor range \* 0.1). In the bottom indicator line before the set concentration value character “S” is displayed, which means that the channel is in the simulation mode. In order to exit the simulation mode, press the “PROG” button or “Contr./Exit” button.

## Programming of Channel Calibration Mode



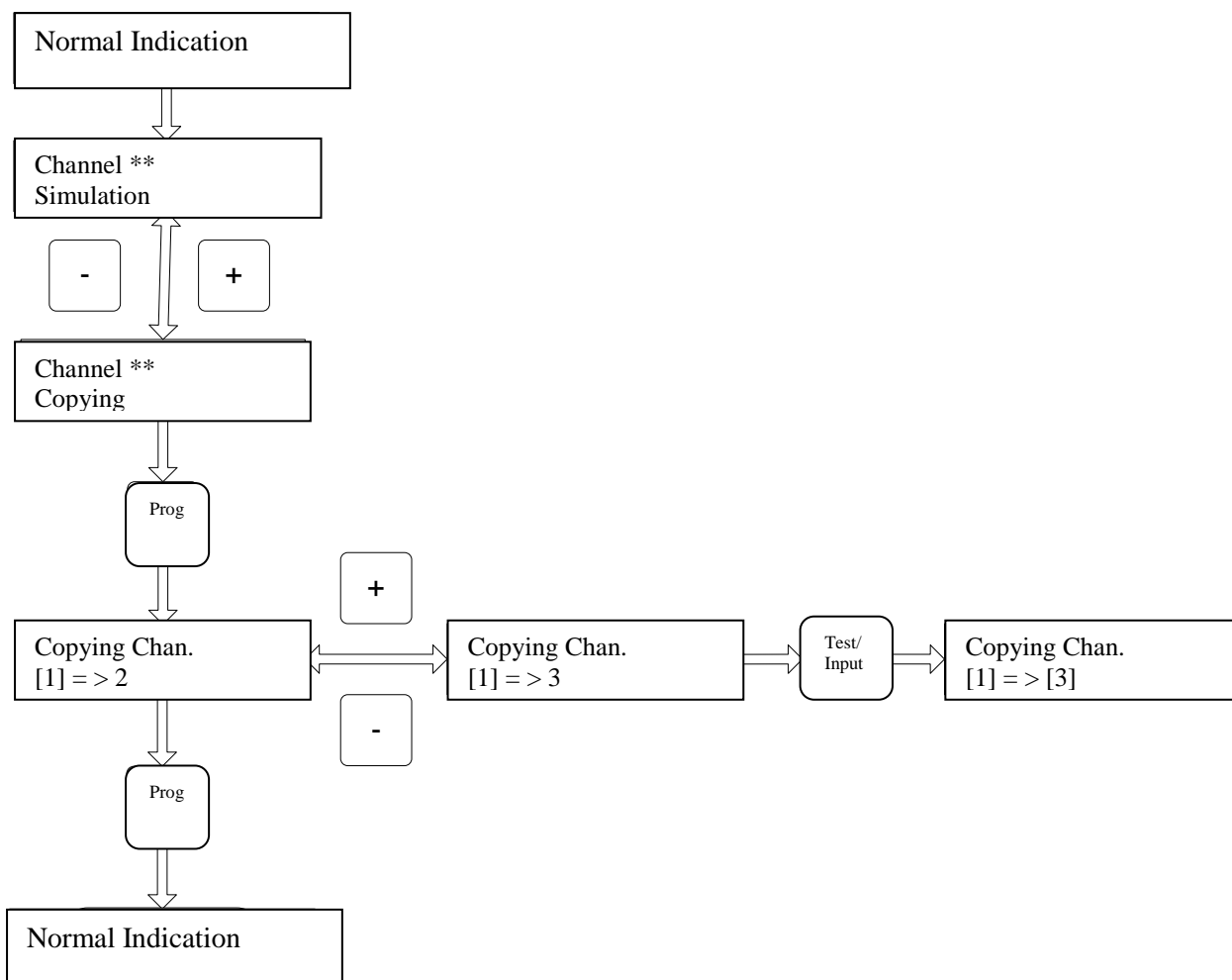
The channel calibration menu enables to set precision of channel board measurement. Select menu “Channel x Calibration”. Press the “PROG” button to go to the menu of concentration measurement accuracy test. In this mode, in the bottom line in front of the measured concentration value, symbol “C” is displayed, which means that the channel is in the calibration mode. In the calibration mode threshold alarms and relays are not actuated. If the channel measurement accuracy is not satisfactory, press the “Prog.” button to go to the mode of

zero offset calibration mode. If the channel measurement accuracy is satisfactory, you can exit the menu by pressing “Conr./Exit”

**Zero offset calibration menu.** The upper line of this menu displays channel number and parameter which characterizes a zero offset conventional value. The bottom line displays symbol “C0” which designates zero offset calibration, measured concentration value, units of measurement and gas type. Use buttons “+” and “-” to change the zero offset conventional value and control the measured concentration value. When you get accurate measurement of concentration by the channel, press the “Test/Enter” button to record the zero offset conventional value in the nonvolatile memory of the channel board.

**Channel sensibility calibration menu.** This menu is similar to the zero offset calibration menu. In the upper right corner a conventional value is displayed which characterizes channel sensibility. In the bottom line, before the concentration value, symbol “C1” is displayed, which designates sensibility calibration. To exit the menu, press the “PROG” button or “Conr./Exit” button.

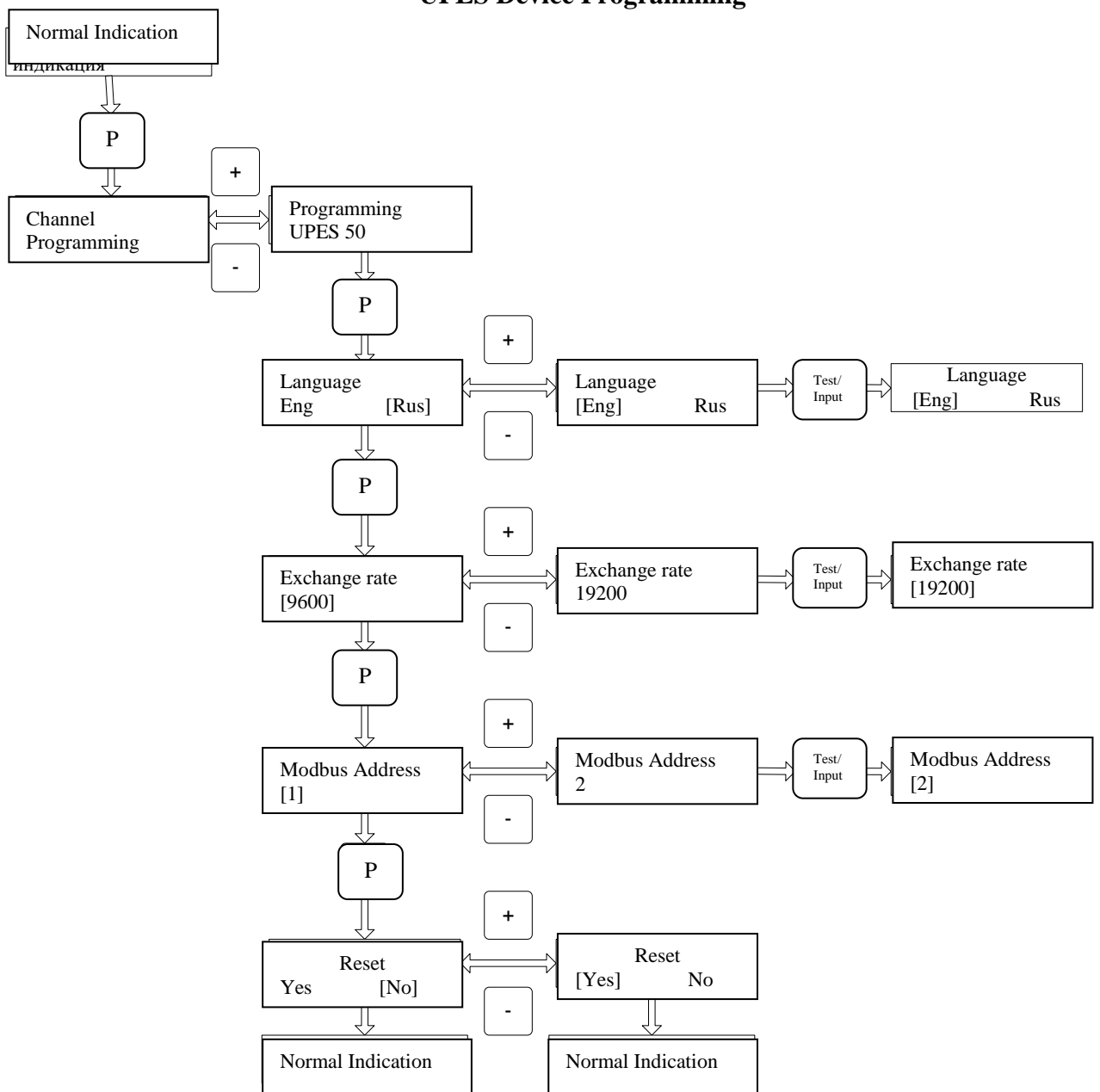
## Programming of Channel Configuration Copying Mode



UPES provides opportunity for channel copying. To do this, select menu “Channel x Copying”. In this menu it is possible copy channel settings into any other channel available in the system. Press the “Prog.” button, in the “Channel x Copying” menu use buttons “+” and “-” to select the desired channel to which you want to copy the settings and press the “Test\Enter” button. After the data are copied into the channel board, the number of the channel to which the settings were copied will be displayed in square brackets. When copying channel settings, the following data are copied:

- Gas type;
- Units of measurement;
- Measurement accuracy;
- Settings for threshold and relay triggering modes;
- Threshold values;
- Detector measurement range;

## UPES Device Programming



Availability of various menu sub items depends on the UPES status, availability of channel boards and availability and status of detectors. To enter the menu, press the “Prog.” button. If UPES does not have channel boards, you can adjust only one menu “UPES Programming” (Fig. 2). In this mode you can set in UPES only these parameters: interface language, rate of exchange with the upper level system and UPES MODBUS address. To set the interface language, use the “Prog.” to select menu or “Language”. Use buttons “+” and “-” to select the desired language and press the “Test/Enter” button. To exit any menu item without setting the selected value, press the “Control” button.

**Programming and Calibration of Values for UPES Measurement Channels  
according to Gas Type**

Value	Gas type	Formula	MAX	ISO
1	Methane	1CH4	0-2.2 vol%/50LEL	
2	Methane	2CH4	0-4.4 vol%/100LEL	
3	Methane	3CH4		0-5.0 vol%/100LEL
4	Propane	1PRO	0-0.85 vol%/50LEL	
5	Propane	2PRO	0-1.7 vol%/100LEL	
6	Propane	3PRO		0-2.1 vol%/100LEL
7	Hexane	1HEX	0-0.5 vol%/50LEL	
8	Hexane	2HEX	0-1.0 vol%/100LEL	
9	Hexane	3HEX		0-1.1 vol%/100LEL
10	Butane	1BUT	0-1.4 vol%/100LEL	
11	Butane	2BUT		0-1.6 vol%/100LEL
12	Isobutane	1ISB	0-1.3 vol%/100LEL	
13	Isobutane	2ISB		0-1.8 vol%
14	Pentane	1PNT	0-1.4 vol%/100LEL	
15	Pentane	2PNT		0-1.5 vol%/100LEL
16	Cyclopentane	1CLP	0-1.4 vol%/100LEL	



17	Cyclopentane	2CLP		0-1.1 vol%/100LEL
18	Ethanol	1ETL	0-3.1 vol%/100LEL	
19	Ethanol	2ETL		0-3.3 vol%/100LEL
20	Carbondioxi de 2	1CO2	0-2 vol%	
21	Carbondioxi de 5	2CO2	0-5 vol%	
22	Methanol	1MTL	0-5.5 vol%/100LEL	
23	Methanol	2MTL		0-6 vol%/100LEL
24	Isobuthylene 20	1IBL	0-20 ppm	
25	Isobuthylene 200	2IBL	0-200 ppm	
26	Isobuthylene 2000	3ISB	0-2000 ppm	
27	Ethylene = Ethene	1ETY	0-200mg/m3/171 ppm	
28	Ethylene = Ethene	2ETY	0-2.3 vol%/100LEL	
29	Ethylene = Ethene	3ETY		0-2.75 vol%/100LEL
30	Benzene	1BNL	0-30mg/m3/9.3 ppm	
31	Benzene	2BNL	0-1.2 vol%/100LEL	
32	Hydrogen	1 H2	0-2 vol%/50LEL	

33	Hydrogen	2 H <sub>2</sub>	0-4.0 vol%/100LEL	
34	Oxygen	O <sub>2</sub>	0-30 vol%	
35	Carbonmon oxide	1CO	0-120mg/m <sup>3</sup> /103 ppm	
36	Carbonmon oxide	2CO	116mg/m <sup>3</sup> /100 ppm	
37	Hydrogensul f 10	1H <sub>2</sub> S	0-10mg/m <sup>3</sup> /7ppm	
38	Hydrogensul f 28	2H <sub>2</sub> S	0- 28.4mg/m <sup>3</sup> /20ppm	
39	Hydrogensul f 45	3H <sub>2</sub> S	0-45mg/m <sup>3</sup> /32ppm	
40	Hydrogensul f 71	4H <sub>2</sub> S	0-71mg/m <sup>3</sup> /50ppm	
41	Hydrogensul f 85	5H <sub>2</sub> S	0-85mg/m <sup>3</sup> /61 ppm	
42	Hydrogensul f 142	6H <sub>2</sub> S	0-142mg/m <sup>3</sup> /100 ppm	
43	Nitrogendio xide	NO <sub>2</sub>	0- 20mg/m <sup>3</sup> /10.5ppm	
44	Sulfurdioxid e50	SO <sub>2</sub>	0- 50mg/m <sup>3</sup> /18.8ppm	
45	Sulfurdioxid e53	SO <sub>2</sub>	53mg/m <sup>3</sup> /20ppm	
46	Ammonia 70	1NH <sub>3</sub>	0-70mg/m <sup>3</sup> /99ppm	
47	Ammonia 71	2NH <sub>3</sub>	71mg/m <sup>3</sup> /100ppm	
48	Ammonia 500	3NH <sub>3</sub>	0- 500mg/m <sup>3</sup> /707pp m	
49	Chlorine15	1CL <sub>2</sub>	0-15mg/m <sup>3</sup> /5ppm	
50	Chlorine30	2CL <sub>2</sub>	0-30mg/m <sup>3</sup> /10ppm	

51	Hydrogen chloride	HCL	0-45 mg/m <sup>3</sup> /0-30 ppm	
52	Hydrogen fluoride	HF	0-8.2 mg/m <sup>3</sup> /0-10 ppm	
53	Ethane	1ETN	0-2.5 vol%/100LEL	
54	Ethane	2ETN		0-3 vol%/100LEL
55	Acetone	ACTN	0-2.5 vol%/100LEL	
56	Toluene	TLN	0-1.1 vol%/100LEL	
57	MTBE	MTBE	0-1.5 vol%/100LEL	
58	Acetylene	1ACN	0-1.15 vol%/50LEL	
59	Acetylene	2ACN	0-2.3 vol%/100LEL	
60	Methylmercaptan	MTMC	0-8mg/m <sup>3</sup> /0-4 ppm	
61	Ethylmercaptan	ETMC	0-10 mg/m <sup>3</sup> /0-4 ppm	
62	Propylene	PRPL	0-2.0 vol%/100LEL	
63	Oil	OIL	100 %LEL	
64	Natural gas	NTGS	0-4.4 vol%/100LEL	
65	Natural gas	NTGS		0-5.0 vol%/100LEL
66	Gasoline	GAS	0-1 vol%/100LEL	
67	Kerosene	KER	0-1.5vol%/100LEL	
68	White spirit	WTS T	0-1.4vol%/100LEL	
69	Diesel oil	DOIL	0-2vol%/100LEL	

70	Petrochemical	PTCM	100LEL	
71	Formaldehyde	FMLD	0-10 ppm	
72	Vinyl acetate	VNAC	0-100 ppm	
73	Heptane	1HEP	0-1.1 vol%/100LEL	
74	Heptane	2HEP		0-1.0 vol%/100LEL
75	Orthoxylene	1OXL	0-1.0 vol%/100LEL	
76	Orthoxylene	2OXL		0-0.9 vol%/100LEL
77	Paraxylene	PXYL	0-1.1 vol%/100LEL	
78	Isopropanol	ISPL	0-2.0 vol%/100LEL	
79	Cyclohexane	1CLH	0-1.2 vol%/100LEL	
80	Cyclohexane	2CLH		0-1.3 vol%/100LEL
81	Ethylbenzene	1ETB	0-1.0 vol%/100LEL	
82	Ethylbenzene	2ETB		0-0.8 vol%/100LEL
83	Petroleum	PETR	100LEL	
84		NO	0-125 mg/m <sup>3</sup> /0- 100 ppm	
85	IPES		18±0.1 mA	18±0.1 mA

## 7. Check of UPES Operation via RS-485 Communication Channel

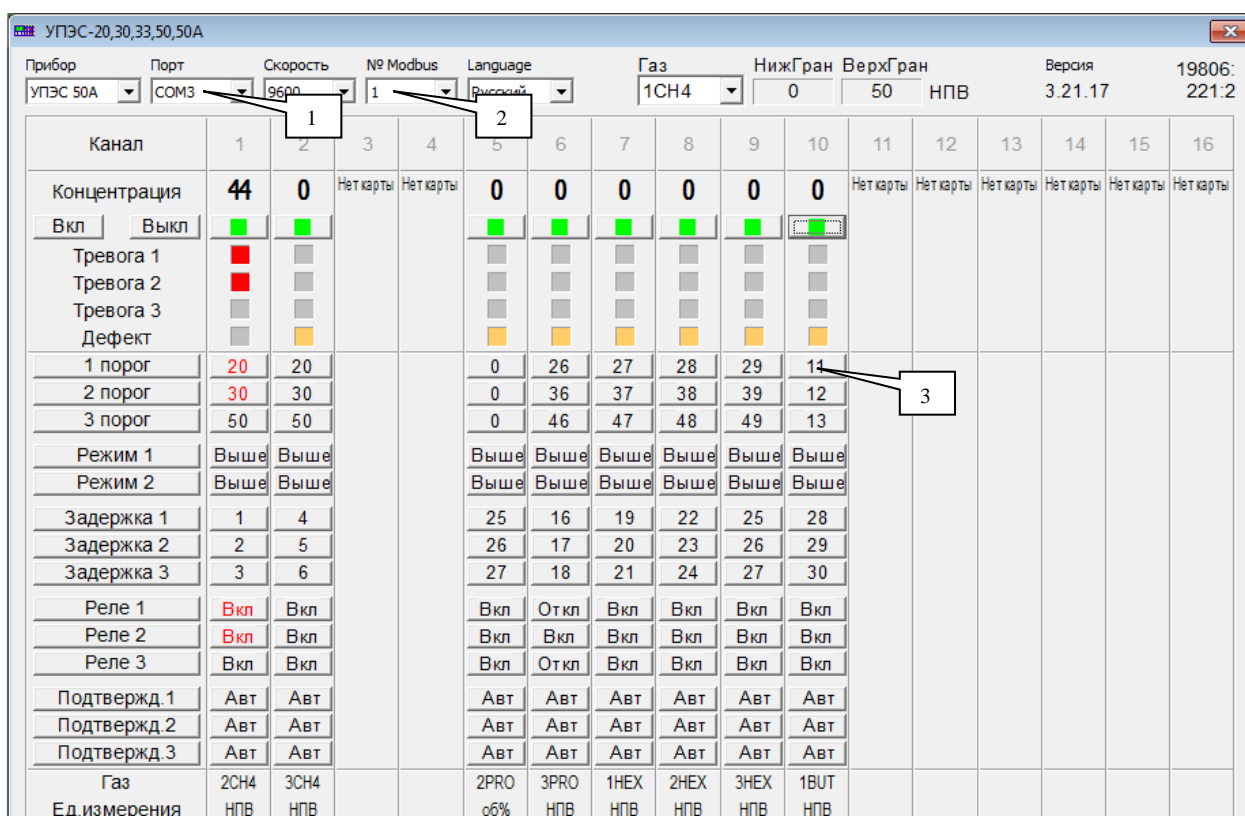
In order to check threshold device operation with a computer via RS-485 communication channel, request the software program from ESP Safety Inc.

Fig. 7. UPES program start of with IPES connected

The screenshot shows the 'УПЭС-20,30,33,50,50А' software interface. At the top, there are configuration options for 'Прибор' (УПЭС 50А), 'Порт' (COM3), 'Скорость' (9600), '№ Modbus' (1), 'Language' (Русский), 'Газ' (1СН4), 'НижГран' (0), 'ВерхГран' (50), 'НПВ', 'Версия' (3.21.17), and '1205:134:0'. Below this is a table with 16 channels. Callout box 1 points to channel 1, callout box 2 points to channel 5, and callout box 3 points to the 'Тревога 1' row in channel 8.

Канал	1	3	4	5	7	8	9	10	11	12	13	14	15	16
Концентрация	0	0	0	0	0	0	Norm	Нет карты	Нет карты	Нет карты	Нет карты	Нет карты	Нет карты	Нет карты
Вкл   Выкл	<input checked="" type="checkbox"/>   <input type="checkbox"/>	<input checked="" type="checkbox"/>   <input type="checkbox"/>	<input checked="" type="checkbox"/>   <input type="checkbox"/>	<input checked="" type="checkbox"/>   <input type="checkbox"/>	<input checked="" type="checkbox"/>   <input type="checkbox"/>	<input checked="" type="checkbox"/>   <input type="checkbox"/>	<input checked="" type="checkbox"/>   <input type="checkbox"/>							
Тревога 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
Тревога 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
Тревога 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
Дефект	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
1 порог	20	22	29	11	25	26	2.0	---						
2 порог	30	32	39	12	35	36	3.0	---						
3 порог	50	42	49	13	45	46	5.0	---						
Режим 1	Выше	Выше	Выше	Выше	Выше	Выше	Выше	---						
Режим 2	Выше	Выше	Выше	Выше	Выше	Выше	Выше	---						
Задержка 1	5	4	25	28	13	16	5	22						
Задержка 2	5	5	26	29	14	17	5	23						
Задержка 3	5	6	27	30	15	18	5	24						
Реле 1	Вкл	Вкл	Вкл	Вкл	Вкл	Вкл	Вкл	Вкл						
Реле 2	Вкл	Вкл	Вкл	Вкл	Вкл	Вкл	Вкл	Вкл						
Реле 3	Вкл	Вкл	Вкл	Вкл	Вкл	Вкл	Вкл	Вкл						
Подтвержд.1	Авт	Авт	Авт	Авт	Авт	Авт	Авт	Авт						
Подтвержд.2	Авт	Авт	Авт	Авт	Авт	Авт	Авт	Авт						
Подтвержд.3	Авт	Авт	Авт	Авт	Авт	Авт	Авт	Авт						
Газ	2СН4	2PRO	1ISB	2ISB	1HEX	2HEX	1СН4	FIRE						
Ед.измерения	НПВ	НПВ	НПВ	НПВ	НПВ	НПВ	об%							

Fig. 8. Program start of with gas detector connected

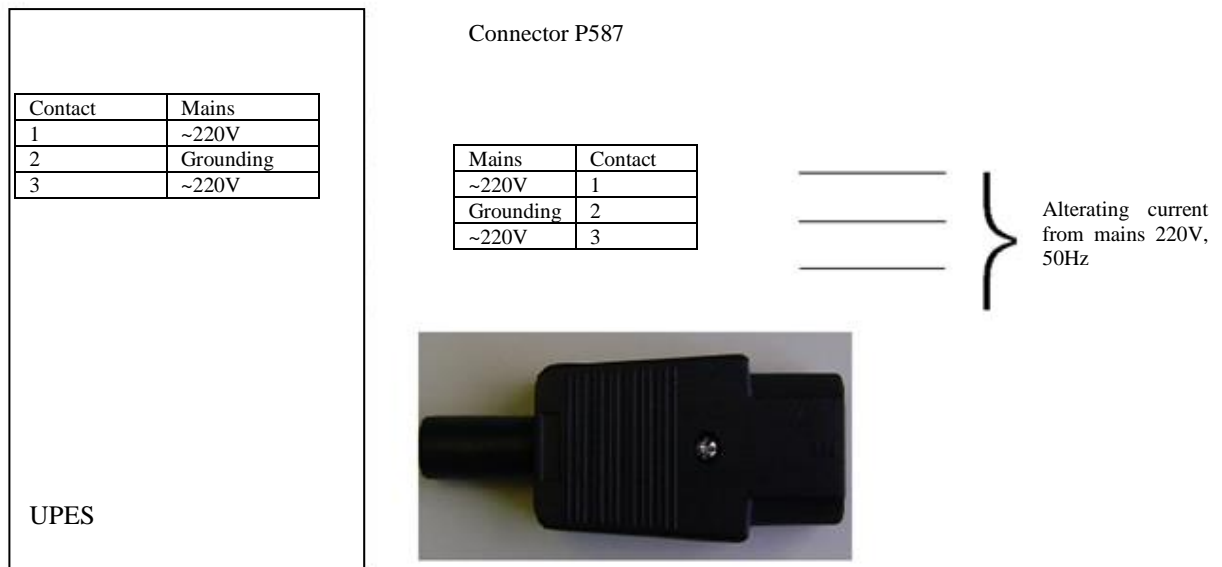


In order to establish connection with the port (position 1), select a network number from the list (position 2) according to the UPES network number. If the connection is successful, settings of each channel are displayed. When pressing the cells with displayed current values (position 3) it is possible to change the values by selection data from the drop-down list or by manual input of data from the keyboard.

## 8. Common Troubles and Remedies

Trouble	Probable cause	Remedy
The channel is not displayed, LEDs do not lit	No power Defective supply-line fuse  Failure of backup supply circuit	Replace supply-line fuses, installed inside the main plug on the power unit rear wall (2 A, 2 ea.). Replace supply-line fuses (12,5 A, 2 ea) installed on the power unit rear wall
Yellow LED glows continuously  “No Signal” message is displayed	Communication line break Defective detector Signal from 0 mA to 1.8 mA	Recover the line Repair or replace the detector
Yellow LED glows continuously “Fault” message is displayed	Defective detector Signal from 1.8 mA to 2.2 mA –	Repair or replace the detector
Yellow LED glows continuously “Need Calibration” message is displayed	Primary detector zero shift Signal from 2.2 mA to 3.5 mA	Set zero, recalibrate the primary detector
“Excess Over” message is displayed	Measurement exceeds the scale value  Signal from 23 mA to 24 mA	Turn the channel OFF and ON. If the message is still displayed, recalibrate. The work shall be performed by a qualified specialist.
The LED does not lit when relay and audible alarm trigger	Defective LED	Replace the LED The work shall be performed by a qualified specialist.
The threshold is exceeded, but external devices do not actuate	Defective relay  Defective external communication lines	Repair the module The work shall be performed by a qualified specialist. Eliminate the defect

## 9. Power cable. Connection diagram



## 10. Marking

The threshold device has the following marking:

- a) manufacturing plant trademark;
- b) UPES conventional designation;
- c) serial number;
- d) year of manufacture.

## 11. Transportation and Storage

11.1 UPES, packed by the manufacturer, can be transported at any distance by any means of transport. When transporting, it is necessary to ensure weather protection of the transport container with packed devices. Placement and securing of cargo in transport facilities shall ensure its stable position during transportation. Shifting of cargo during transportation is not permitted.

11.2 Rail wagons, containers and car bodies used to transport the device shall be free of any signs of cement, coal, chemicals etc.

11.3 UPES, packed by the manufacturer, during their guaranteed storage life shall be stored in premises free of dust, alkali/acid fumes, aggressive gases and other harmful impurities.

## 12. Acceptance Certificate

UPES-50A underwent running-in during 72 h and is found fit-for-service.  
Values of the operating thresholds for each channel are preconfigured if based on



customer's information, otherwise, all channels are set to methane as default.

### **13. Warranty**

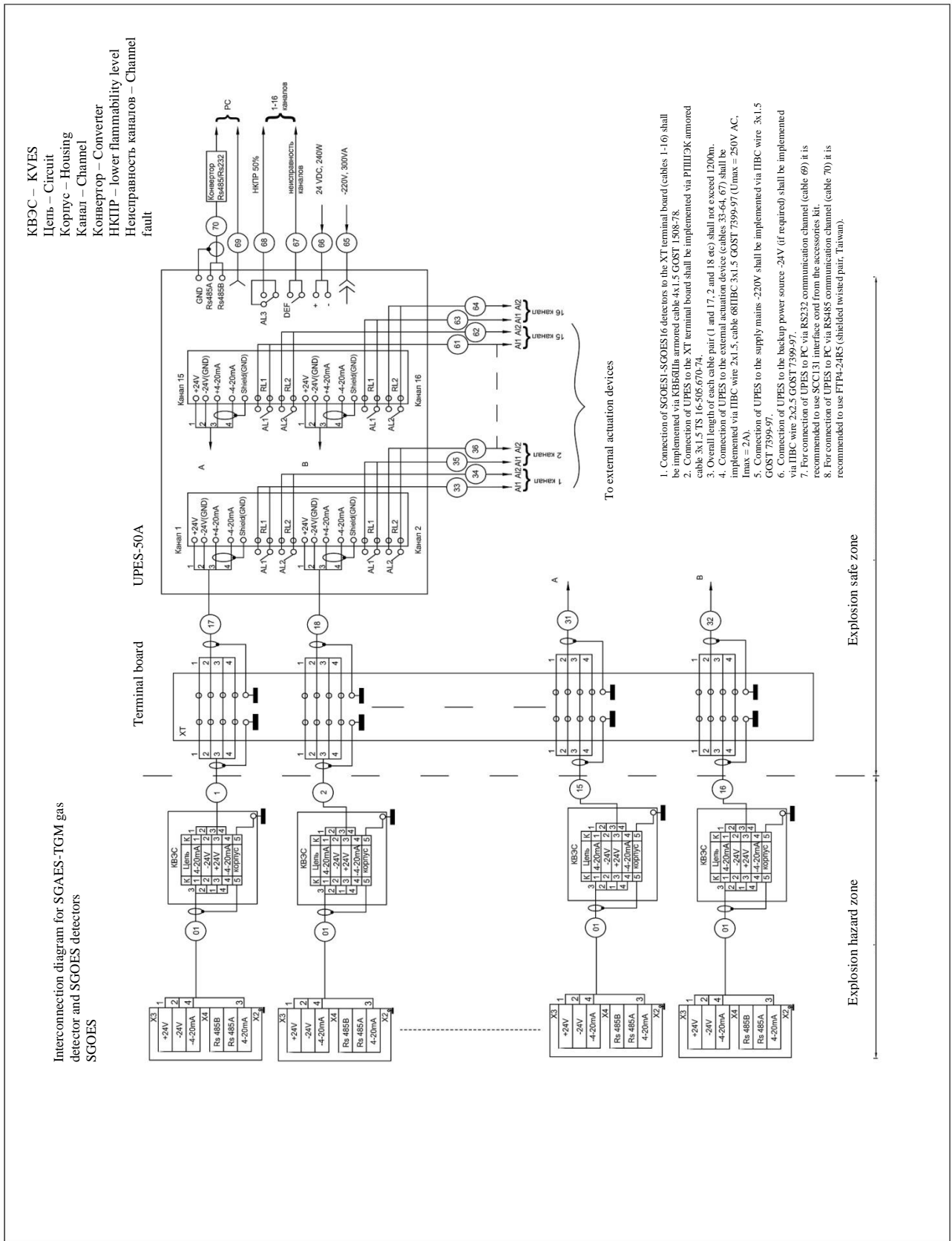
Warranties: ESP Safety Inc, 555 N. First Street San Jose, CA 95112 USA, guarantees the UPES system will be free of manufacturing defects for 5 years after date of commissioning, provided the customer follows all guidelines pertaining to installation, operation, and maintenance detailed in this Operating Manual. Unit Warranty During this warranty period, the manufacturer will correct any failures detected in the UPES system or replace any damaged unit free of charge. Expected Service Life of Unit The average expected life of the UPES system is no less than 10 years

### **14 Maintenance**

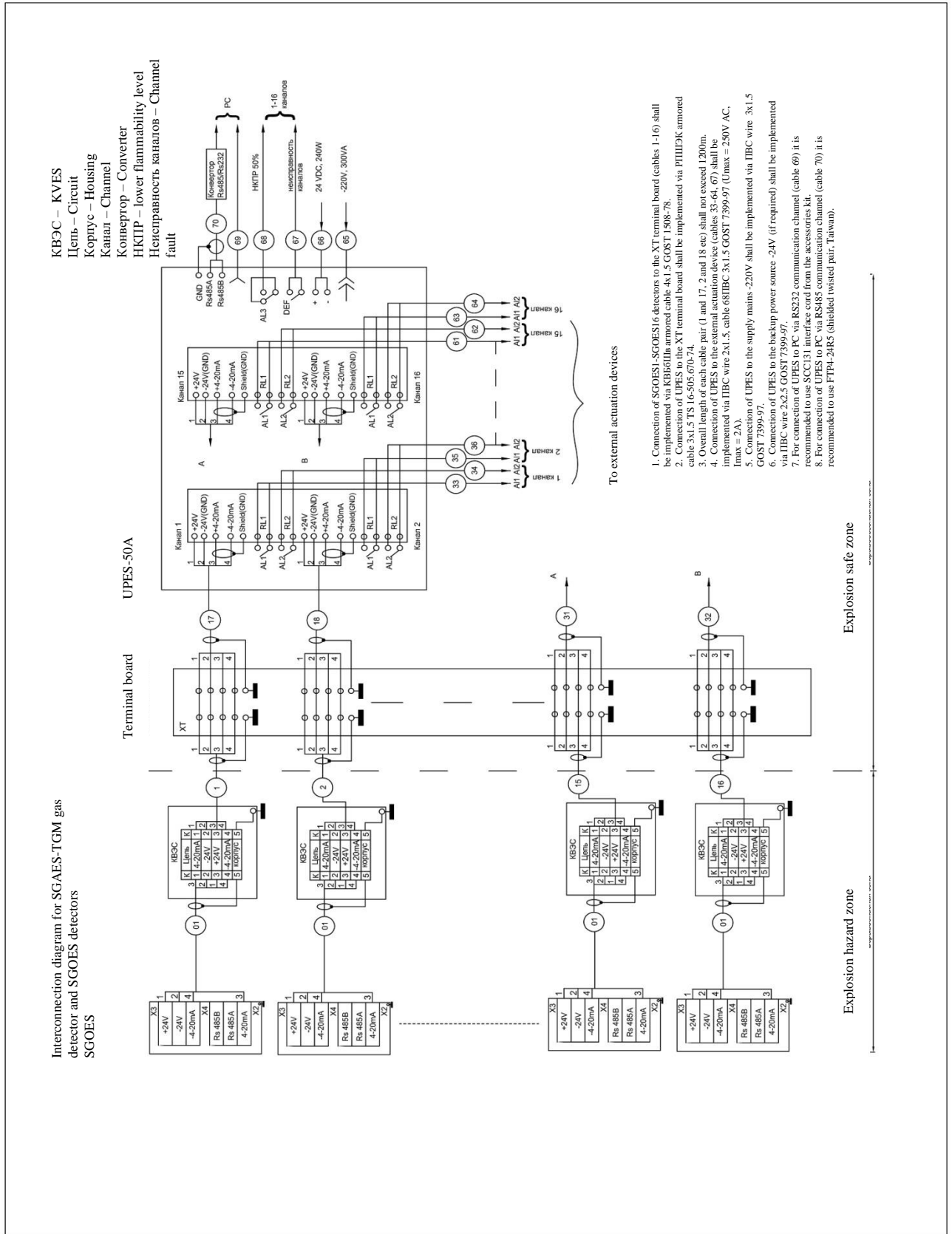
14.1 UPES is intended for long-term continuous operation and requires special routine works to be implemented during operation. The list of routine maintenance is specified in Annex 6.

14.2 In case of any doubt in UPES operation validity, it is recommended to check the validity of channel programming. Channel programming shall be performed in accordance with the cyclogram specified in this manual. Programming of other UPES parameters shall be also performed in accordance with the cyclogram specified in this OM.

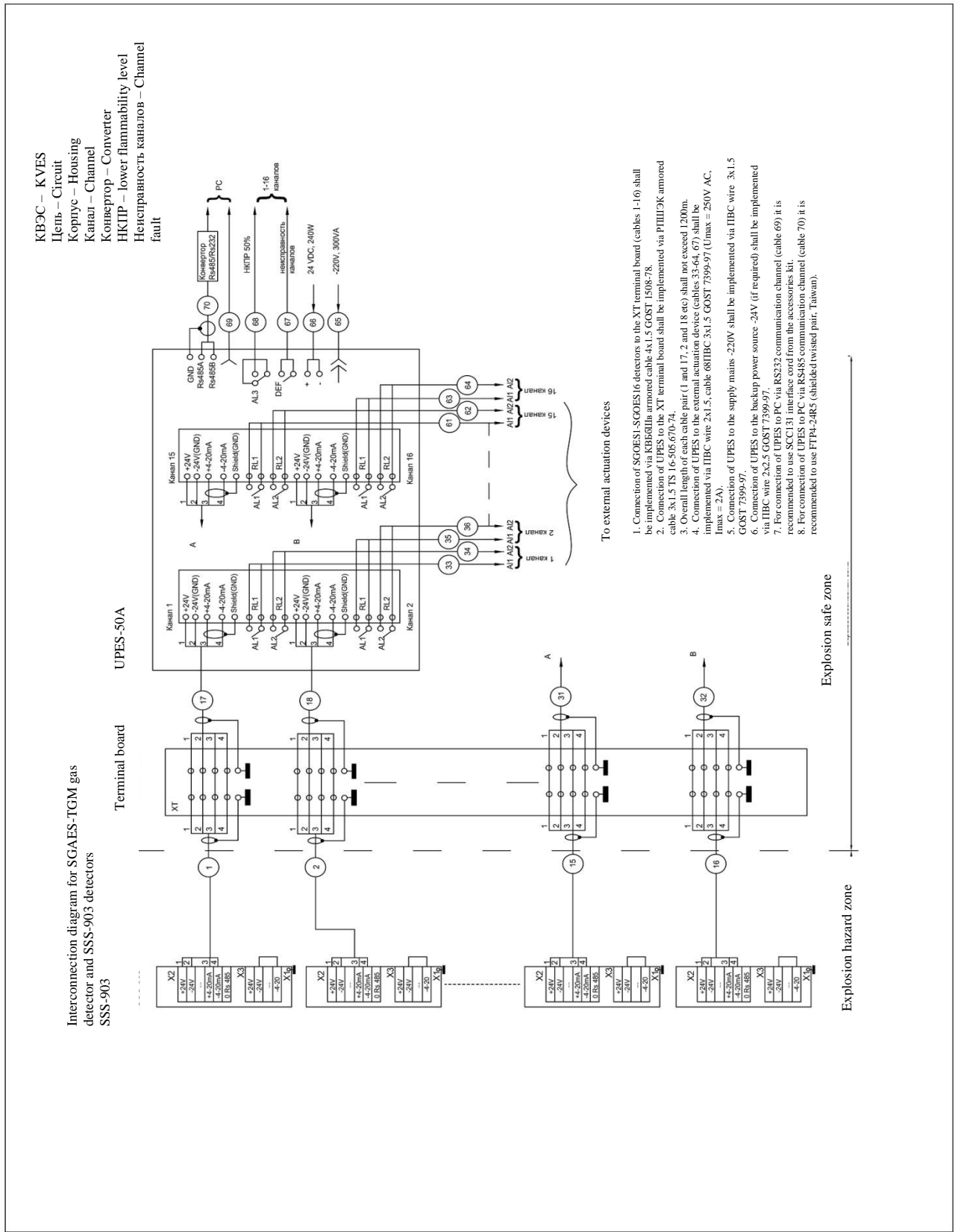
# Annex 1. SGOES Gas Detector and UPES Interconnection Diagram



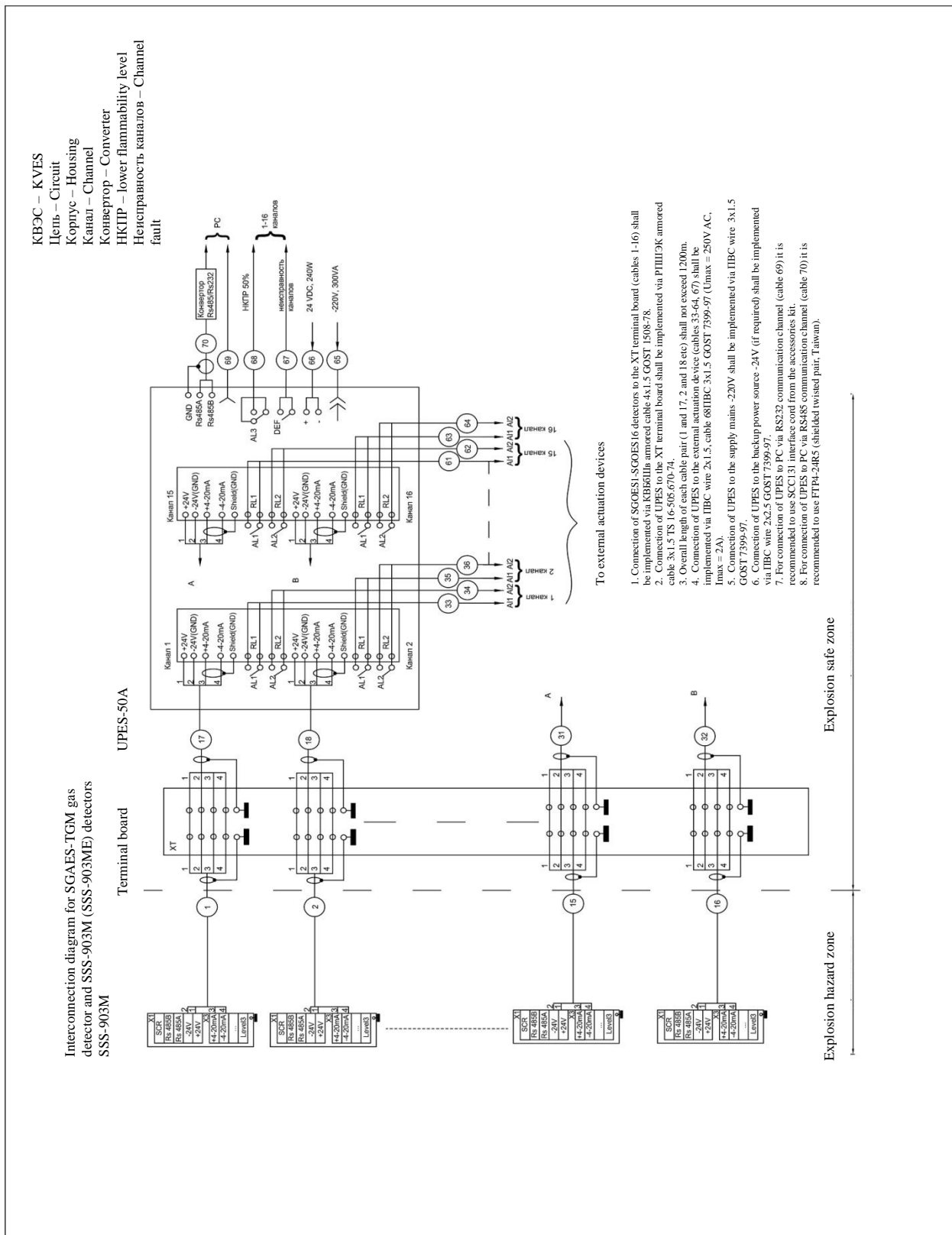
## Annex 2. SGOES-M11 and UPES Interconnection Diagram



### Annex 3. CCC-903 SSS-903 Gas Detector and UPES Interconnection Diagram



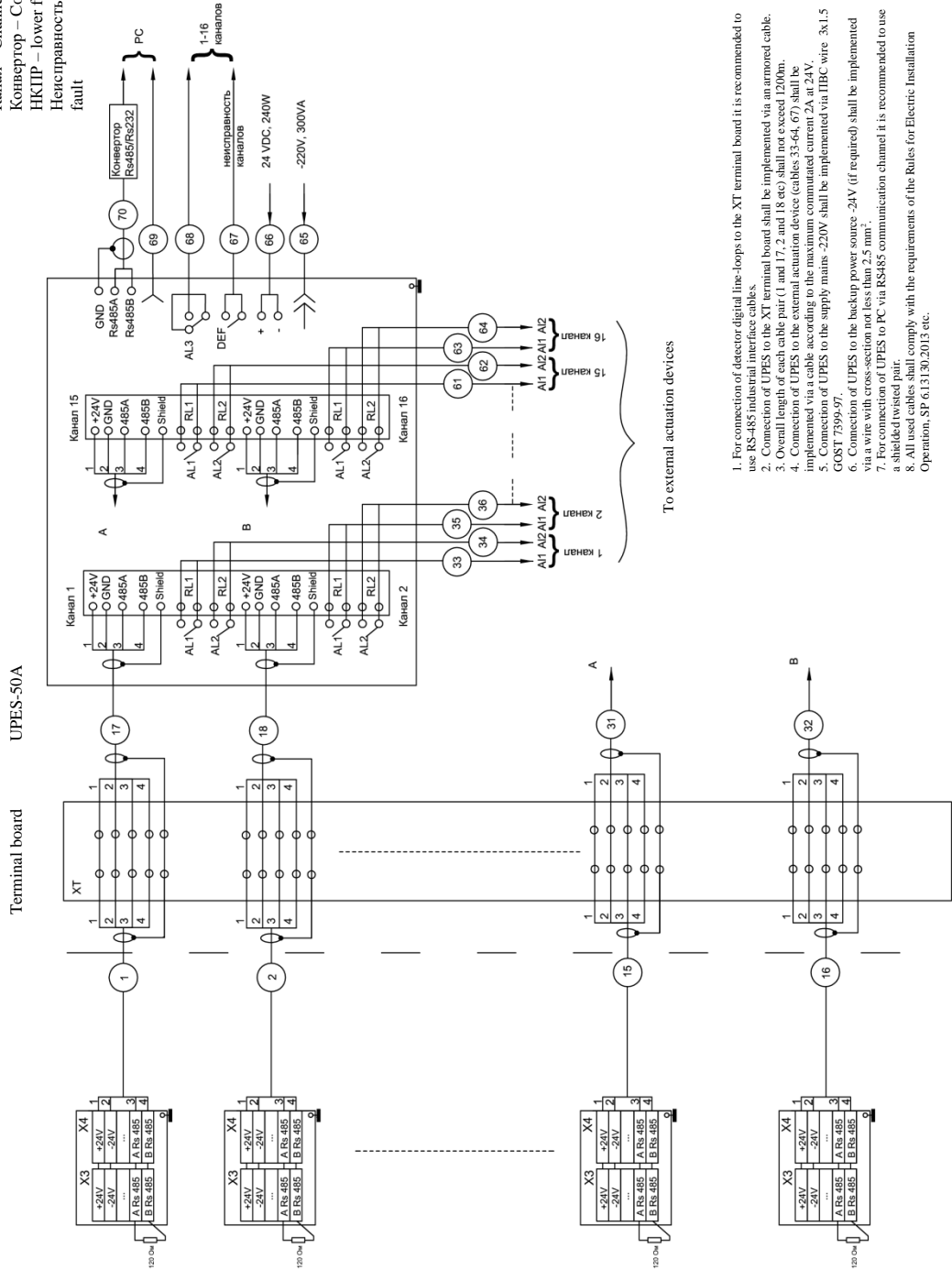
## Annex 4. SSS-903 M(ME) and UPES Interconnection Diagram



# Annex 5. IPES and UPES Interconnection Diagram

КВЭС – KVES  
 Центр – Circuit  
 Корпус – Housing  
 Канал – Channel  
 Конвертор – Converter  
 НКПР – lower flammability level  
 Неисправность каналов – Channel fault

Interconnection diagram for IPES flame detectors and UPES-50 UPES-50



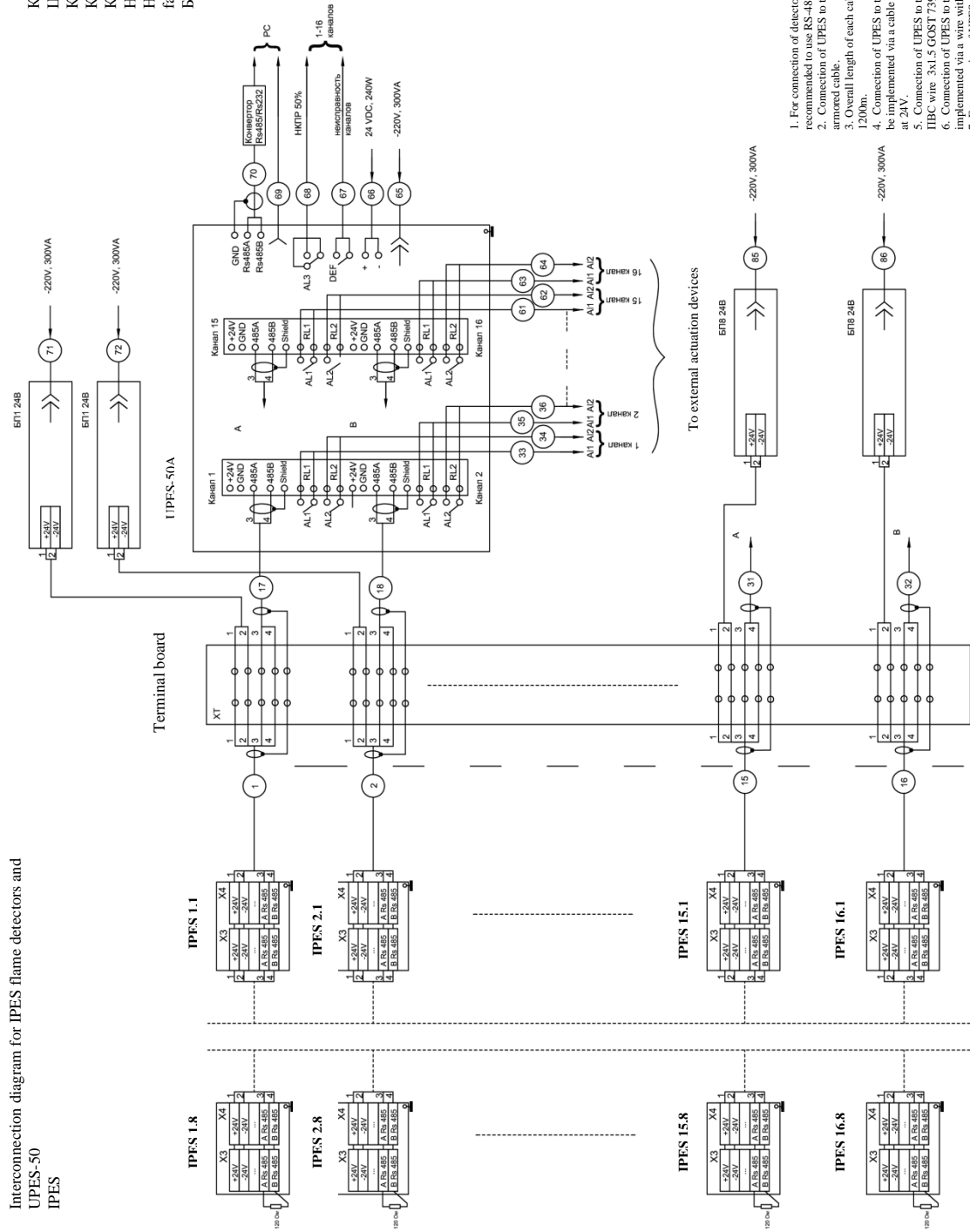
1. For connection of detector digital line-loops to the XT terminal board it is recommended to use RS-485 industrial interface cables.
2. Connection of UPES to the XT terminal board shall be implemented via an armored cable.
3. Overall length of each cable pair (1 and 17, 2 and 18 etc) shall not exceed 1200mm.
4. Connection of UPES to the external actuation device (cables 33-64, 67) shall be implemented via a cable according to the maximum commutated current 2A at 24V.
5. Connection of UPES to the supply mains -220V shall be implemented via IIBC wire 3x1.5 GOST 7399-97.
6. Connection of UPES to the backup power source -24V (if required) shall be implemented via a wire with cross-section not less than 2.5 mm<sup>2</sup>.
7. For connection of UPES to PC via RS-485 communication channel it is recommended to use a shielded twisted pair.
8. All used cables shall comply with the requirements of the Rules for Electric Installation Operation, SP 6.13.130.2013 etc.

Explosion hazard zone

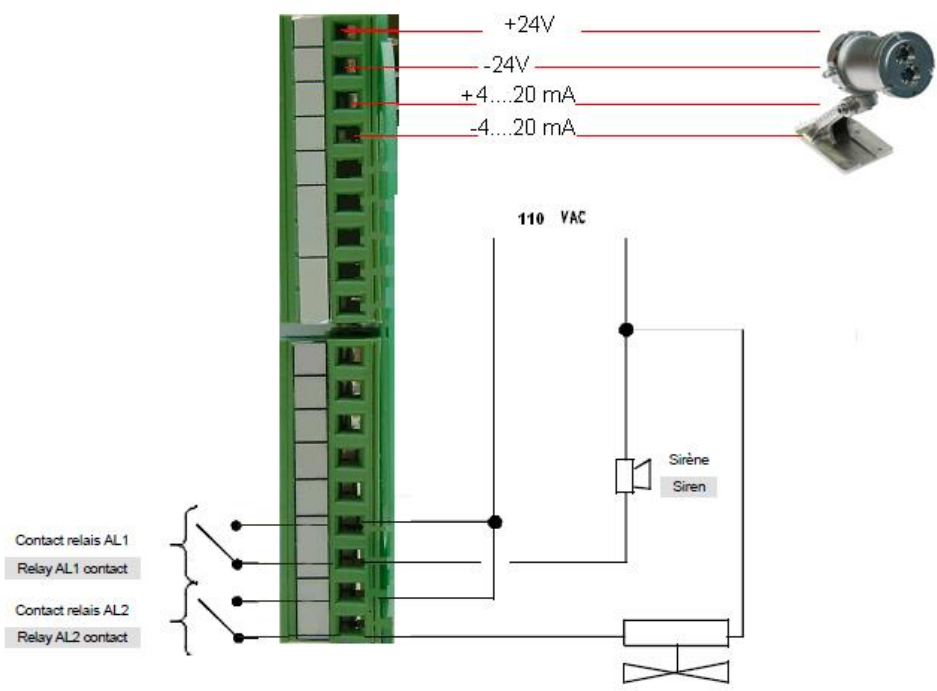
Explosion safe zone

Interconnection diagram for IPES flame detectors and UPES-50 IPES

КВЭС – KVES  
 Цепь – Circuit  
 Корпус – Housing  
 Канал – Channel  
 Конвертор – Converter  
 НКПР – lower flammability level  
 Неправильность каналов – Channel fault  
 БП1 24В – BP1 24V



1. For connection of detector digital line-loops to the XT terminal board it is recommended to use RS-485 industrial interface cables.
2. Connection of UPES to the XT terminal board shall be implemented via an increased cable.
3. Overall length of each cable pair (1 and 17, 2 and 18 etc) shall not exceed 1200m.
4. Connection of UPES to the external actuation devices (cables 32-64, 67) shall be implemented via a cable according to the maximum commutated current 2A at 24V.
5. Connection of UPES to the supply mains -220V shall be implemented via IBC wire 3x1.5 GOST 7599-97.
6. Connection of UPES to the backup power source -24V (if required) shall be implemented via a wire with cross-section not less than 2.5 mm<sup>2</sup>.
7. For connection of UPES to PC via RS485 communication channel it is recommended to use a shielded twisted pair.
8. All used cables shall comply with the requirements of the Rules for Electric Installation Operation, SP 6.131.30.2013 etc.





## **Annex 6. Preventive Maintenance during UPES Operation**

Preventive maintenance is the procedure and frequency of works on maintenance and restoration of UPES efficiency during its operation.

All types of performed works are classified into three subgroups:

- 1) maintenance;
- 2) technical repair;
- 3) major overhaul.

**1 Maintenance.** Maintenance includes:

- maintenance check;
- preventive inspection.

Maintenance check is performed by an EC&I engineer (or a person that replaces him/her) in order to timely detect and eliminate any malfunctions during operation.

The maintenance scope covers the following works:

- 1.1 Visual inspection of equipment.
- 1.2 Dust and dirt elimination.
- 1.3 Switching on test mode in order to check operability.
- 1.4 Minor troubleshooting.
- 1.5 Check of grounding.
- 1.6 Check of supply mains voltage.
- 1.7 Check of protection.
- 1.8 Check of harness and terminal connections state.

**2 Technical repair.** The scope of technical repair includes all maintenance operations plus the following works:

- 2.1 Opening of the threshold device.
- 2.2 Washing and cleaning of mechanical parts and contact connections.
- 2.3 Elimination of detected defects.
- 2.4 Cleaning of connectors.
- 2.5 Insulation withstand-voltage test.
- 2.6 Measurement of insulation resistance.

**3 Major overhaul.** The major overhaul includes all technical repair operations plus the following works:

- 5.4 Replacement of individual channel modules and other assemblies by specialists authorized for such works.

### **Maintenance and Repair Frequency**

Maintenance and repair shall be with the following frequency:

- maintenance check – every day;

- maintenance – once per quarter;
- technical repair – once per year;
- major overhaul – once per 5 years.