

Gas Detection System SGAES-TG Operating Manual

80018-001 R01



Gas Detection Systems SGAES-TG
Operating Manual
80018-001 R01

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1.0 Introduction

! Notice: *It is important that this entire manual be thoroughly read and understood prior to installing or operating the SGAES-TG gas detection system, to avoid compromising performance and safety.*

The SGAES-TG gas control system's advanced technology is configured for maximum sensitivity to a wide range of combustible and toxic gas and rapid alarm signaling. After being programmed with the desired thresholds, the SGAES system will transmit light (LED) and sound alarms as well as signals to responding devices, such as warning systems, automatic sprinkler systems, ventilation systems, and emergency shutdown controls.

The system comprises the UPES Multi-Channel Controller and the primary gas detectors; the SGOES Combustible Gas Detector; and/or the SSS-903 Toxic Gas Detector. The stand-alone UPES Multi-Channel Controller, which may be installed up to 3,600 feet away from the explosion hazard area, is capable of remotely powering and monitoring up to 16 gas detectors when utilizing the analog outputs, and up to 480 gas detectors when utilizing the digital outputs.

The controller faceplate incorporates a two-line, 16-character LED display and five control buttons for programming, calibrating and resetting the system. Each channel provides two operation status LEDs and three alarm status LEDs. Alarm actuation (High, Auxiliary, and Low alarm indications, and Fault signals) is provided on three adjustment levels, in addition to LED activation and failure signaling of each measuring channel.

A unified analog current signal 4-20 mA with RS-485 Modbus RTU protocol facilitates communication between the controller and the gas detectors. The system has both automatic and manual test diagnostics.

The combination of the UPES Multi-Channel Controller and the SGOES/SSS-903 gas detectors makes this system an excellent choice for monitoring dangerously explosive combustible gases and mass concentration of toxic substances in the working area.

Our Mission

ESP Safety Inc's mission is to provide complete turn-key protection solutions beginning with the design stage, through system commissioning, and on-going field service in hazardous environments. Our line of industry-leading products, services, and systems benefits society, saves lives, and preserves capital resources.

***ESP Safety Inc
Contact
Information***

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2.0 Description

Application

The SGAES-TG's design and explosion-proof ratings make it an excellent choice for indoor and outdoor applications, including:

- Drilling and production platforms
- Shipping tankers, freighters, and other vessels
- Fuel loading facilities
- Refineries, bulk terminals, and tank farms
- LNG/LPG processing and storage facilities
- Compressor stations and pipeline facilities
- Petrochemical, paint, and fertilizer plants
- Power plants and gas turbine facilities
- Transportation facilities (airports and subways)
- Oil and gas fired boilers / furnaces
- Primary metal processing
- Gas and electric utilities

Specifications

UPES Multi-Channel Controller

The SGAES-TG system meets industry certifications and requirements for Hazardous Locations.

Voltage supply: 110V (± 10 V), 60 Hz (± 1 Hz) frequency / 24 VDC from 18 to 32 VDC.

Power consumption: Does not exceed 300 VA

Outputs: RS-485 Modbus RTU compatible with PLC's, SCADA, & DCS systems 4-20 mA analog output;
Three relays (dry contact) with programmable alarm level
One relay for fault condition

Display: Two-line, 16-character indicator, displaying gas types and concentrations

Indicator's status: 3 color LED indicator; 4 alarm LED indicators: green = normal operation, one red = low alarm, two red = auxiliary alarm, three red = high alarm, yellow = fault

Enclosure Material: Rated IP 54 (type 3S) for dust and water protection

Wiring: 14 AWG (2.08 mm²) shielded cable recommended

Dimensions: Width 19" (482 mm); depth 9.3" (266 mm); height 5.19" (132 mm); standard block type 3U19"

Weight: 37.47 lbs. (17.0 kg)

SSS-903 Toxic Gas Detector

Detection type: Toxic gas

Voltage supply: 24 VDC from 18 to 32 VDC

Power consumption: ≤ 4.8 W

Outputs: RS-485 Modbus RTU; 4-20 mA; relay "dry" contact; HART

Sensor Type: Electrochemical, infrared, photoionized

Humidity range: 0 to 100% RH (non-condensing)

Operating Temperature: -40°F to +167°F (-40°C to +75°C)
-76°F to +167°F (-60°C to +75°C)

Ingress protection: IP 66

Indicator's status: Tri-colored status indicator; three LED alarm level response diodes; one LED calibrator indicator

Display: Large 96-character – LCD display providing continuous graphical indication of trending data for Peak Reading and Time-Weighted Average (TWA) of gas concentration

Dimensions: 10" (25.4 cm) X 7.4" (18.8 cm)

Enclosure Material: 316 SS (Standard) / Aluminum (Optional)

Conduit connection: ¾" NPT; two conduit entries

Wiring: 14 AWG (2.08 mm²) shielded cable is recommended.

Weight: 12.12 lbs (5.5 kg)

SGOES Combustible Gas Detector

Detection type: Combustible gas

Voltage supply: 24 VDC from 18 to 32 VDC

Power consumption: 2 W on standby; < 4.5 W during alarm

Outputs: RS-485 Modbus RTU; HART; 4-20 mA; 2 alarm relays (isolated, dry contact type) with programmable alarm levels; fault relay indicating optical path obstruction

Sensor Type: Optical IR

Humidity range: 0 to 100% RH (non-condensing)

Operating Temperature: -40°F to +167°F (-40°C to +75°C)

Ingress protection: IP 66

Dimensions: 11.5" (29 cm) X 4.5" (11.5 cm)

Enclosure Material: 316 SS (Standard) / Aluminum (Optional)

Conduit connection: ¾" NPT; two conduit entries

Wiring: 14 AWG (2.08 mm²) shielded cable is recommended.

Weight: 13.4 lbs. (6 kg) with mounting bracket

Faceplate Description

Faceplate

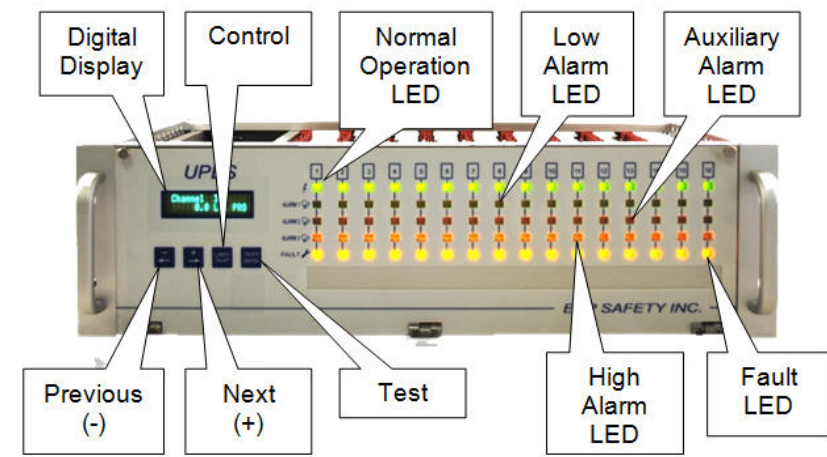


Figure 2-1: Faceplate of the UPES Multi-Channel Controller

The UPES faceplate provides LEDs for identifying status conditions, and a two-line display of gas types and concentrations.

Digital Display

The UPES front panel incorporates an integrated two-line, 16-character LED display and five control buttons for programming, calibrating and resetting the system. Through the faceplate, users are able to navigate the programming, calibration, and resetting procedures. It also provides users with a digital readout of the gas concentration level and the channel indicated (Refer to section 6.0 Calibration and Alarm Level Setpoints). Each channel is displayed for 20 seconds before moving on to the next channel. Fault conditions and calibration are also displayed on the digital display.

LED Indicators

Each channel is equipped with four LED digital indicators (visible and identified on the front panel of UPES).

LED digital indicators:

Normal Operation LED -- One steady green. On = Normal function. Off = Channel not in service or fault.

Low Alarm LED -- One steady red when a sensor signal exceeds low setpoint.

Auxiliary Alarm LED -- Two steady red when a sensor signal exceeds auxiliary setpoint.

High Alarm LED -- Three steady red when a sensor signal exceeds high setpoint.

Fault LED -- One steady yellow when a system fault is detected on channel (e.g., there is a fault on the channel; there is an open-circuit fault between detector and UPES). Power-up time delay is indicated by a steady yellow.

Pushbuttons

The UPES faceplate is equipped with four pushbuttons to navigate through system programming, calibration, and resetting.

Previous (-) :

Normal Mode –

- Manual display of the previous channel

Maintenance (Programming) Mode –

- Manual display of the previous menu
- Decrease value, alarm level, etc.
- Display previous choice (on-off, etc.)

Next (+) :

Normal Mode –

- Manual display of the next channel

Maintenance (Programming) Mode –

- Manual display of the next menu
- Increase value, alarm level, etc.
- Display next choice (on-off, etc.)

Control:

Normal Mode –

- Clearing of alarm

Maintenance (Programming) Mode –

- Exit from current menu

Test:

Normal Mode –

- Start self-test manually

Maintenance (Programming) Mode –

- Confirmation of choice

***Automatic
Diagnostics &
Fault
Identification***

The yellow LED indicator will light on the corresponding channel when there is a fault condition on one or more channels (e.g., line interrupted, short-circuited, negative-going signal), and the common UPES fault relay will be activated.

The "dry contacts" relays are located on the screw terminal connector on the rear side of UPES power supply (with notice Fault). Fault relay contacts are normally open in actuated mode and during the operation of all channels. When a fault is detected, the relay is activated and the dry contacts are closed.

Alarm Activation

If gas concentration at the detectors' installation area is increased beyond the alarm level setpoint, relays al1, al2, al3 are activated within 1-5 seconds after increasing (LEDs switching). Normal open "dry" contact relays al1, al2 are output on screw terminals connectors on each channel module. The relay contacts are closed and remain in closed state until the gas concentration return to below alarm level setpoint values.

3.0 Safety Considerations

! Important: *Before installing and operating the SGAES-TG gas control system, be sure to read this entire manual. Failure to follow these guidelines could result in impaired product performance and safety hazards.*

Guidelines

For maximum safety:

- Only persons who have thoroughly read and understood this manual, have received training in safety techniques, and have electric-safety certificates are permitted to install and operate the SGAES-TG gas control system.
- Never operate the SGAES-TG gas control system if the casing of any component is damaged.
- Do not separate the SGOES/SSS-903 gas detectors when energized.
- Refer to the Appendices and diagrams in this manual to ensure that the wiring is in compliance with local ordinances and the NEC.
- Perform regular testing and maintenance as outlined in the Maintenance section.

Also see the individual sections in this manual for relevant specific safety guidelines.

FM Compliance

SGAES	Meets FM Approvals, certifications and requirements for Electrical Equipment for Use in Hazardous (Classified) Locations, General Requirement, FM 3600 (November 1998).
<i>FM 3810</i>	Electrical and Electronic Test Measuring and Process Control Equipment (2005).
<i>FM 6310, 6320</i>	Combustible Gas Detectors (January 2001)
<i>FM 3615</i>	Explosion-Proof Electrical Equipment – General Requirements (2006)

4.0 Installation

! Caution: *Only personnel trained in safety techniques who have electric-safety certificates and experience in dangerous explosive zones should install the SGAES-TG gas detection system. They should be familiar with the design of the SGAES-TG gas detection system and thoroughly read and understand this Operating Manual.*

Upon Receipt of Equipment

All equipment shipped by ESP Safety, Inc. is pre-packed in shock absorbing containers which provide considerable protection against physical damage. The contents should be carefully removed and checked against the packing list. If any damage has occurred or there is any discrepancy in the order, please notify ESP Safety as soon as possible. All subsequent correspondence with ESP Safety must specify the equipment part number and the serial number. Each item and piece of equipment is completely checked by the factory. However, a complete check-out is necessary upon initial installation and start-up to ensure system integrity.

Component Parts and Delivery Set

The SGAES Gas Detection System component parts and delivery set consists of the following:

- One UPES Multi-Channel Controller (10070-001)
- One Gas Detection Systems SGAES-TG Operating Manual (80018-001)

Gas Detectors (purchased separately):

- SSS-903 Toxic Gas Detector (10060-001)
- SGOES Combustible Gas Detector (10050-001)
- Display UPES-903(10060-002)

Accessories (purchased separately):

- Mounting Rack
 - A mounting rack is recommended for controller installation. 3Ux19" racks are available.
- Gas Calibration Kit
 - Calibration kits include regulator, hose, three (3) disposable gas cylinders, a cylinder recycling tool, and a portable case.

- Each kit is customizable for gas types and concentrations.
- Splash Guard
- Calibration Cup

Compare the contents of the set to the packing list to be sure all items were received. If any items are missing, contact ESP Safety Inc.

Notes:

- For component parts and delivery set for the SGOES Combustible Gas Detector and the SSS-903 Toxic Gas Detector, please refer to the operating manuals, as applicable, for these detectors:
 - SGOES Combustible Gas Detector Operation Guide (80014-001 R01)
 - SSS-903 Toxic Gas Detector Operation Guide (80016-001 R01).

! Caution: *Before proceeding with the installation of the SGAES-TG gas detection system, it is imperative that the installation area be tested to confirm the absence of toxic or combustible gases. Use a portable gas detection device to verify the absence of toxic or combustible gases before performing any calibration or maintenance.*

Sensor Location

Sensor placement depends upon the type of gas to be monitored and the conditions of the job site. Once the most likely gas-accumulation areas and leak sources have been identified, take the following into consideration when installing the sensors:

- Identify all high-risk areas to determine the number of sensors needed for adequate coverage. Be aware of overlapping areas which can provide additional protection.
- For lighter-than-air gasses (e.g., methane, acetylene, hydrogen), the sensor should be placed above the potential gas leak.
- For heavier-than-air gasses (e.g., Butane, propane, benzene, hexane), the sensor should be placed close to the floor.
- After determining how rapidly the gas will diffuse into the air, place the sensor as close to the anticipated source of the gas leak as practical.
- Using smoke generator tests, identify typical air current patterns and place sensor in the areas where the most concentrated accumulation of gas can be expected.
- Place sensor away from possible sources of contamination or failure (e.g., intense sunlight, excessive heat, vibration).
- Place the sensor pointing down (this prevents contaminant buildup on the gas inlet).
- Locate the sensors for ease of testing and calibration.

! Caution: *When selecting placement of the diffusion-based gas sensors, make sure they contact the target gas for accurate gas measurement.*

**General Wiring
Requirements**

! Caution: *The wiring color and type must comply with local codes, ordinances, and the IEC/NEC. It is recommended that the local authority be consulted in case of doubt.*

Wire Size and Type

- If installing wiring cable in conduit, do not use conduit for wiring to other equipment.
- Five wire shielded cable is highly recommended for connecting the controller to the gas detector.
- 14 AWG (2.08 mm²) shielded cable is recommended. The gauge of the wire used determines the maximum distance between the controller and the gas detector.

Note: Follow the wiring instructions in this manual and the applicable gas-detector manuals to ensure correct functioning of the detectors.

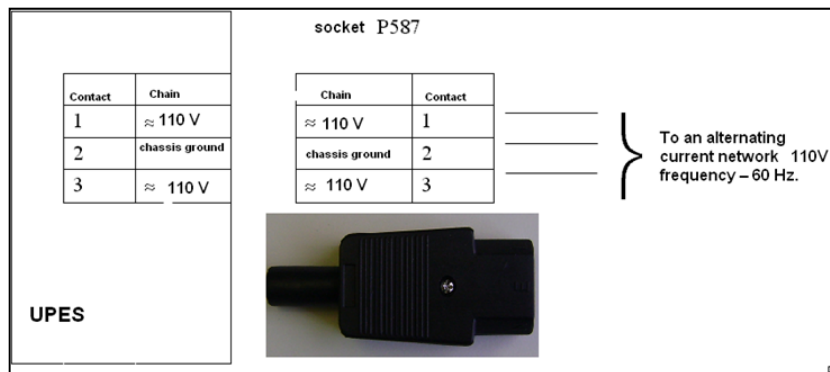
Controller Wiring

! Caution: *Do not apply power to the SGAES-TG gas detection system until all the wiring is complete and has been verified.*

- The use of a mounting rack is recommended. When mounting to a rack, ensure that there is an empty space above and below the controller of at least 5.19" (132 mm).
- The use of a UPS module to connect to the UPES is recommended, to prevent breaks in power during short-time power disconnections (up to eight minutes) or brownouts
- The controller should be grounded by a clamping screw located in the bottom of the power adapter rear wall.

**Power Cable
Connection**

The UPES power cable should be connected as shown in the diagram below.



**Figure 4-2: Diagram of UPES
power cable connection**

! Warning: *Do not separate casing of components when energized! Separating the casing can result in serious damage to the components which could go undetected, resulting in failure to detect toxic and combustible gas.*

**Relay
Connections**

Use the settings in Appendix B: UPES Relay Connections for the appropriate relay connection schematic.

**Gas Detector
Connections**

Use the connections diagrams in Appendix C: Gas Detector Connections for the appropriate gas detector connection schematic.

***Completing the
Installation*****Installation Checklist**

The following checklist summarizes the installation steps described in this section. You may use this checklist to make sure you have included all steps in the process.

1. Refer to the gas-detector manuals for full procedures on detector installation.
 - SGOES Combustible Gas Detector Operation Guide (80014-001 R01)
 - SSS-903 Toxic Gas Detector Operation Guide (80016-001 R01).
2. Check that the gas detectors have been installed in the proper orientation (horizontal for SGOES and with the sensor pointing down for SSS-903).
3. Use bolts and rubber inserts (provided in gas detector accessory kit) to install the gas detectors.
4. Check that the gas detectors are securely mounted to the mounting surface.
5. Check that the gas detectors are grounded by outer grounding clamps.
6. Check for the presence of consistent grease on the exterior ground terminal.
7. Check that all conduit and glands have been tightened hermetically.
8. Remove the three (3) bolts on the back cover of the SGOES Gas Detector, label all wires, and attach wires to power / RS-485.
9. Remove cover of the Display UPES-903. Using the four screws provided, gently lift the faceplate out of the unit. Label wires and attach the wires from the SGOES unit (power / RS-485).
10. Label wires from the UPES Multi-channel Controller to the Display UPES-903 and attach power and 4-20 mA wires.
11. Verify connections between the Display UPES-903 and the SGOES, as well as between the Display UPES-903 and any control room devices.
12. Re-install the screws on the back cover of the SGOES Gas Detector, checking the o-ring between the enclosure and the back cover.
13. Carefully re-insert the Display UPES-903 faceplate, ensuring that the four (4) indication LEDs are on the top and the one (1) operation LED is on the bottom. Re-install the cover and tighten locking screw.
14. Check that the power wiring to the controller is installed;

power source is functioning properly.

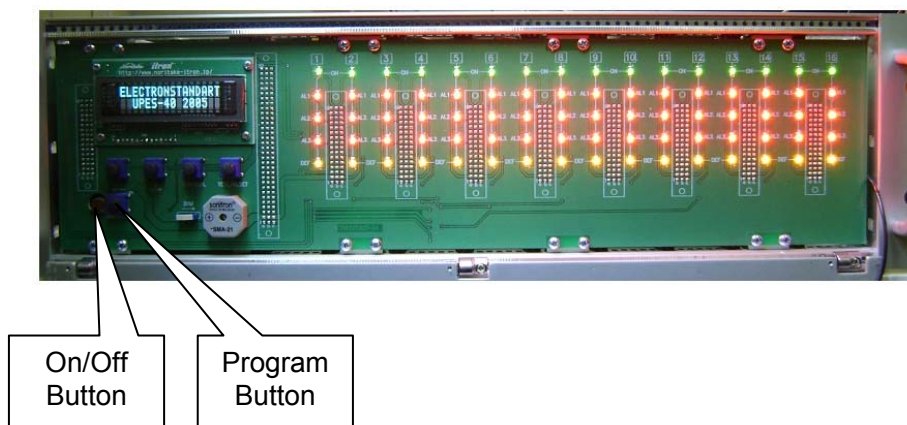
15. Verify that proper connections have been made from external loads to the din-rails, and label them (See Appendix D – UPES Mounting Rack).
16. Verify the input voltage for the UPES-40.
17. Verify that the controller frame is grounded (See Appendix E – UPES Power Block / Grounding).
18. Attach the wires from the controller channel cards to the din-rails.
19. All removable parts should fit the enclosure as tightly as possible.

5.0 Startup and Operation

! Notice: *It is important that this entire manual be thoroughly read and understood prior to operating the SGAES-TG gas detection system, to avoid compromising performance and safety. Only personnel trained in safety techniques who have electric-safety certificates and experience in dangerous explosive zones, and are familiar with the design of the SGAES-TG gas detection system and have thoroughly read and understood this Operating Manual, should operate the SGAES-TG gas detection system.*

Note: Before starting up the system, refer to the installation checklist in Section 4.0 Installation

! Warning: *Before testing, be sure to switch off all output loads normally activated by the gas detection system. This prevents inappropriate activation.*



Controller

To Start the UPES Test

- Loosen two screws on the front panel and swivel the front panel down.
- Press the **On/Off** button located at the bottom left of the front circuit.
- The display panel will first show AUTOTEST UPES-40

2005, then "ELECTRONSTANDART UPES-40 2005."

- During this test, all operation channels will light continuously; red and yellow LEDs will flash; and the buzzer will sound continuously in the ON buzzer position.
- The unit will go into INITIALIZATION mode for one minute. During this time, all alarms are disabled, and the current outputs are 1 mA for the channels in service.
- Next, the unit performs a self-test on its buzzer and all its light-emitting diodes for one minute.

Once the test is completed, the channels in service are then returned to normal operation, and the corresponding alarms and relays are enabled.

- The red and yellow LEDs will be off.
- The buzzer is off.
- The green LEDs are steady on, indicating all channels and communication lines are operating, and that the gas concentration is below the first alarm level setpoint in the installation area.
- An example of the display panel is illustrated below:



Figure 5-1: Example of display panel after self-test

Note: A manual test can be carried out by pressing the **Test** button at any time. To interrupt the self-test cycle before its completion, press the **Control** button.

Gas Detectors

Please refer to the operating manuals for the specific gas detectors for the start-up procedure.

- SGOES Combustible Gas Detector Operation Guide 80014-001 R01
- SSS-903 Toxic Gas Detector Operation Guide 80016-001 R01

Functional Test

A functional test is defined as a brief exposure of the system detectors to a concentration of gas (es) that are in excess of the lowest alarm level for each channel. The purpose of this test is to verify sensor and alarm operation, and is not intended to be a measure of the accuracy of the instrument.

Note:

The functional test is an optional test only and is not required.

**Review of
Channel
Parameters**

After completion of the self-test, the system is ready for operation.

- Check to make sure no yellow LEDs indicate the presence of faults.
- Check channel activation, indicated by the presence of steady green LEDs on the corresponding channels.
- If the green channel LED indicator is not lit, go to programming mode and check channel activation, as follows:

Channel Activation

- Make sure the controller is on, and the front panel has been swiveled down.
- Using the **Next (+)** or **Previous (-)** display keys, set the number of the channel being checked.
- Press the **Program** button twice. Using channel 1 as an example, the display should read as follows:

Channel1

or

Channel1

[On]

[Off]

- Press the **Next (+)** or **Previous (-)** display keys until either "On" appears (indicating activation of the channel), or "Off" appears (indicating non-operation of the channel).
- Press the **Test** button to save your selection.
- Press the **Control** button to return to Operation mode.

Calibration

The UPES Multi-Channel Controller does not require calibration. Calibration should only be performed on Gas Detectors.

Refer to the operating manuals for the specific gas detectors for the start-up procedure.

- SGOES Combustible Gas Detector Operation Guide 80014-001 R01
- SSS-903 Toxic Gas Detector Operation Guide 80016-001 R01

6.0 Menu Operation and Programming

Symbol	Value
P	Program Pushbutton
+	Next (+) Pushbutton
-	Previous (-) Pushbutton

Menu Operation

The SGAES-TG gas detection system alarm level setpoints are preset at the factory, but can be adjusted to fit the purchaser's needs. When the controller is powered on, programmed concentration levels for the calibrated gases are displayed as percentages of LEL.

Menu Operation

To review current channel parameters:

Cycle the UPES controller **Program** button to review the current values of the channel parameters.

The UPES can be programmed on 5 menus:

- Programming Channel
- Programming Simulation
- Programming Calibration
- Programming Channel Copy
- Programming Unit UPES-40

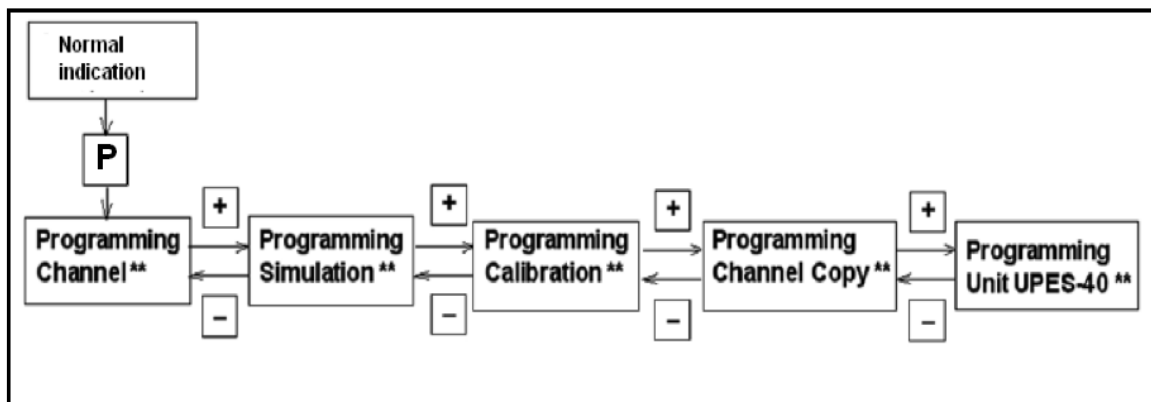
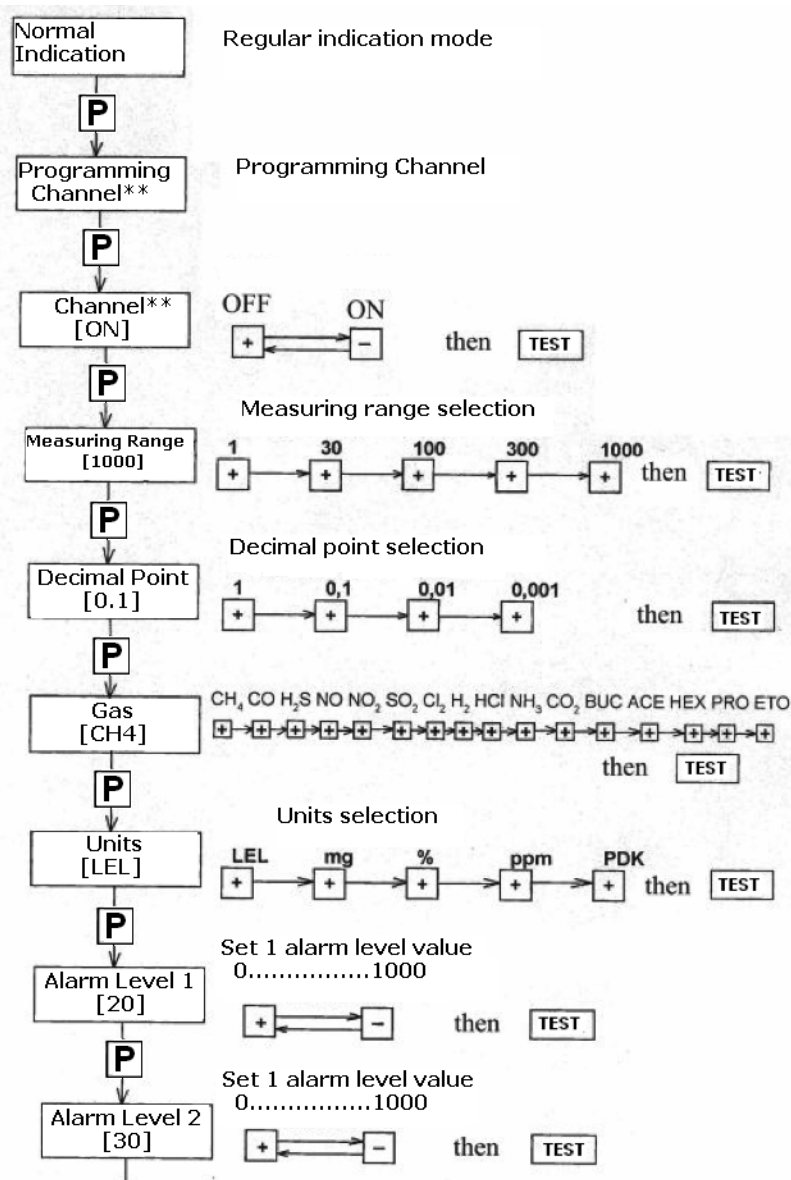
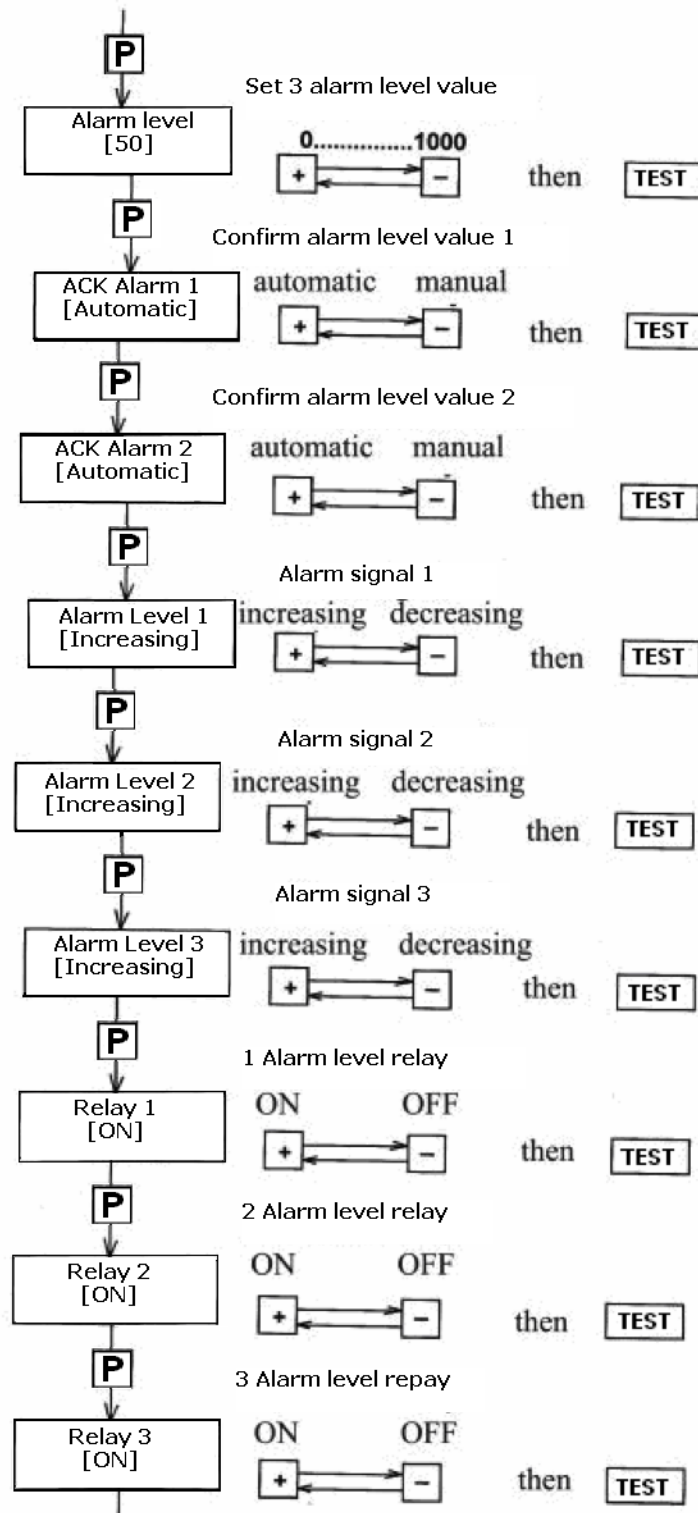


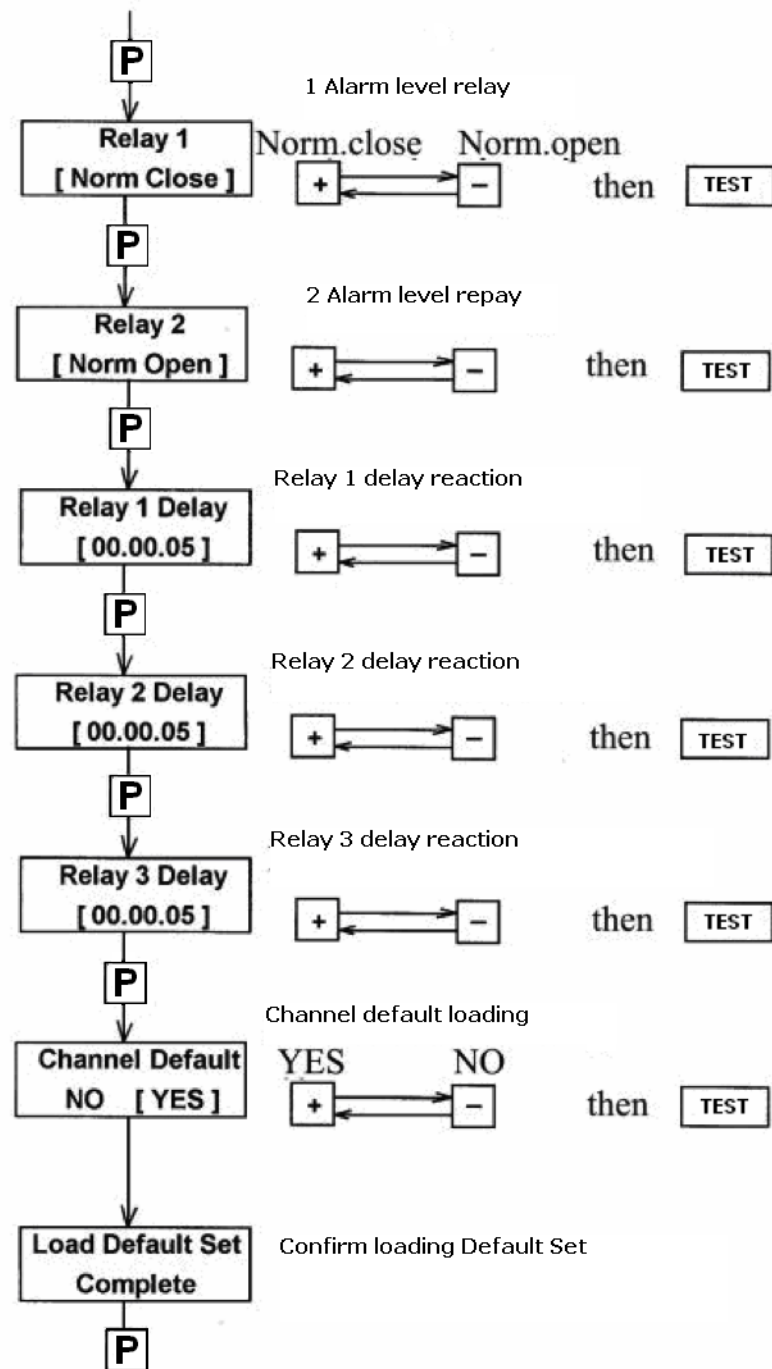
Figure 6-1: Block diagram of main menu

**Programming
Channel**

This function allows users to program channels for gas type, measuring range, measuring units, alarm levels, and alarm signals.

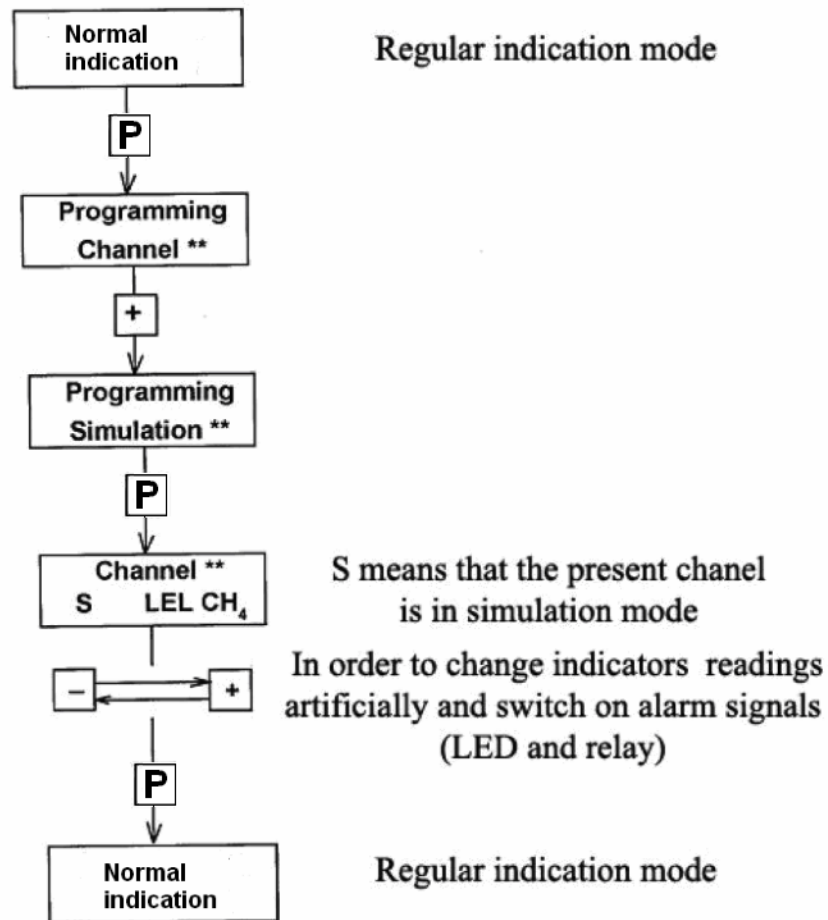






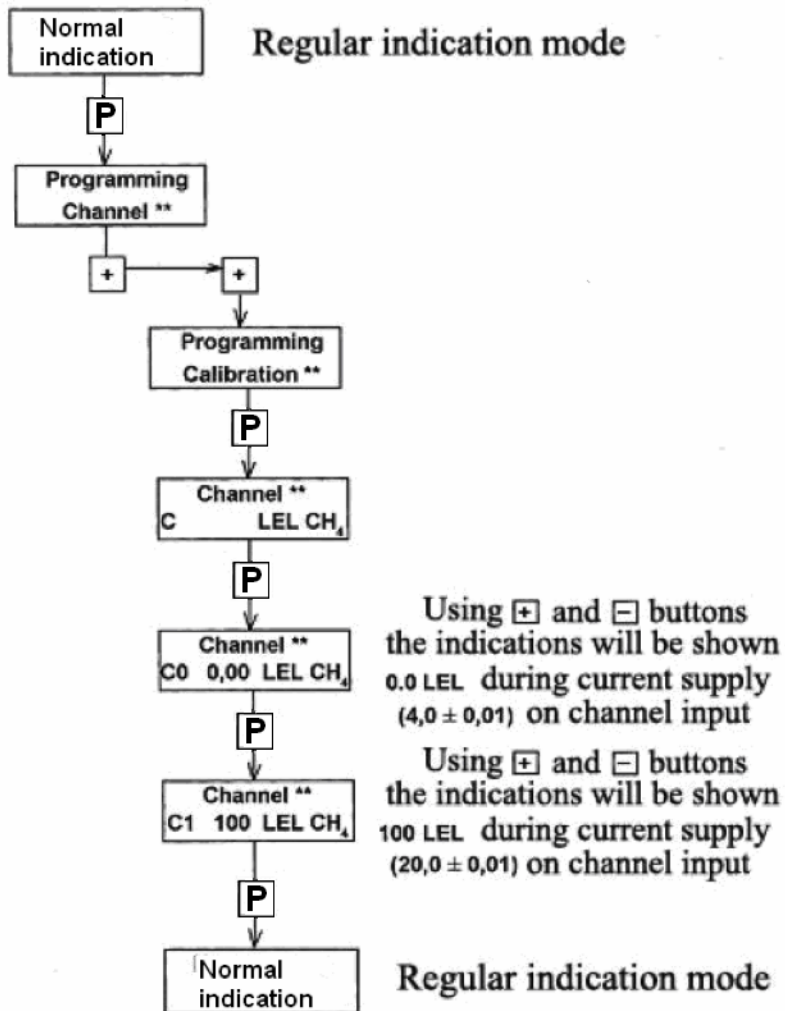
**Programming
Simulation**

This function allows users to artificially increase the gas concentrations on each channel in order to check operability of each relay and light alarm indication.



**Programming
Calibration**

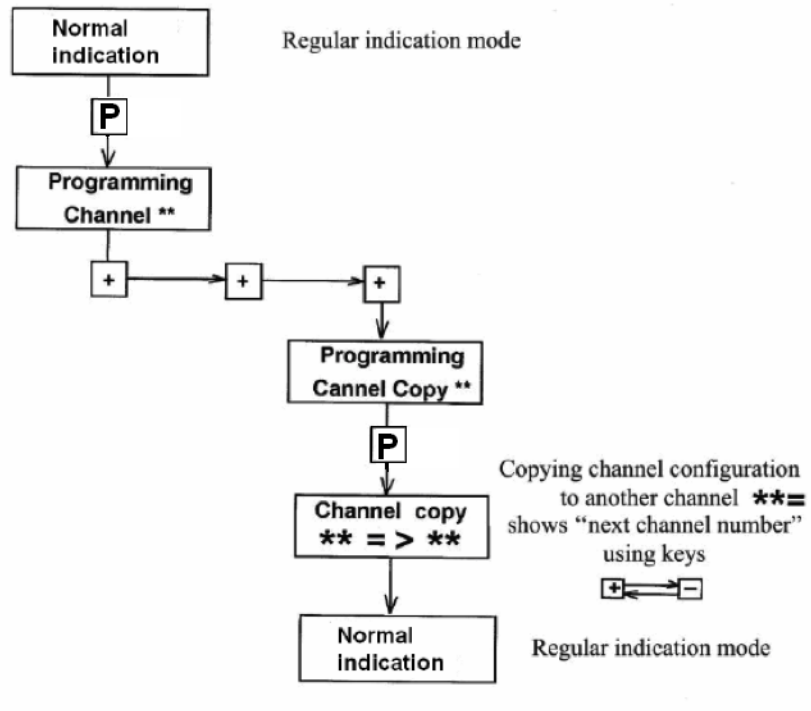
This function allows users to calibrate channels.



Repeat calibration of the channel 3-4 times until there are indications on 0.0 LEL indicator with deviation of no more than 1.1 LEL

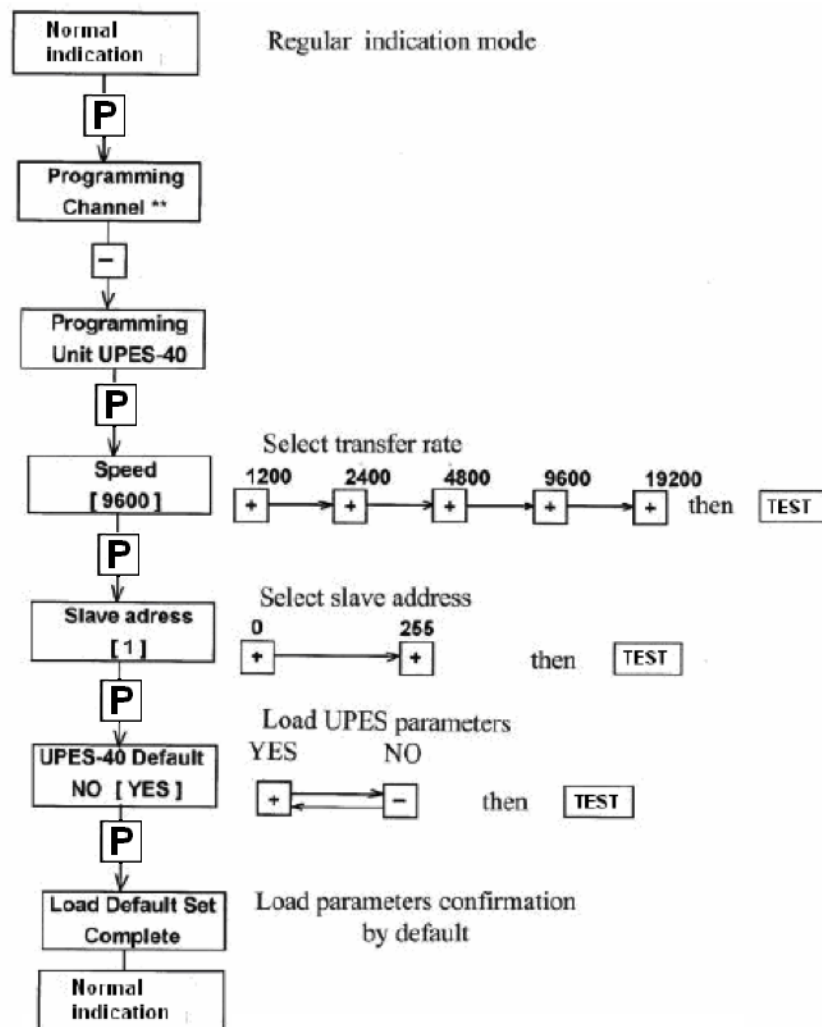
**Programming
Channel Copy**

This function allows users to copy channel settings to other channels.

COPY MENU FOR UPES CHANNEL

**Programming
Unit UPES-40**

This function allows users to setup digital communications with the UPES controller and ESP Safety's gas detectors.



7.0 Troubleshooting

Troubleshooting Table

If testing reveals a Fault condition or failure to detect a gas, the first step is to confirm proper completion of the system's wiring, programming and calibration. Then follow the troubleshooting procedures in the table below, which describes a variety of possible failures and corrective actions.

If the troubleshooting procedures do not correct the problem, contact ESP Safety Inc. ESP will determine whether the system can be repaired in the field.

Table 7-1: Troubleshooting Symptoms, Causes and Procedures

Failure Symptoms	Possible Cause	Corrective Procedure
Display channel not lighted; no LED indicator light.	No supply voltage.	Replace fuses located in the inside of wall plug at the back of power supply block of the UPES unit (2 A).
	Main fuses have blown.	Replace fuses (10A) located at back of the power supply block.
	Power backup fault.	
Yellow fault LED indicator is on (in steady mode).	Faulty electrical connections on the telemetry line (wires and detector).	Check the connections on the UPES terminal block and the gas detector terminal block to be sure they are properly connected.
	Faulty gas detector.	Repair or replace the gas detector.
	Delay in powering on.	Wait five minutes after powering on. If fault indicator continues to display, restart system again. If condition does not clear, replace controller.

A red LED indicator does not light up even though the corresponding alarm level setpoint is exceeded and the buzzer and relay are activated.	Faulty LED.	Replace the LED.
An alarm is triggered but slaving controls are not activated.	Faulty relays.	Replace the relay on the corresponding module.
	Faulty electrical connection.	Check terminal diagram to ensure that all wires have been connected properly.
Indication is not displayed.	Faulty display.	Solder the display.
	Faulty processor board.	Replace the processor board.

! Caution: *If controller replacement is necessary, make sure power is switched off before removing it from the rack or replacing it.*

Confirm that jumper plugs and rocker switches in the replacement match those of the original.

8.0 Maintenance

! Warning: *Before testing, be sure to switch off all output loads normally activated by the gas detection system. This prevents inappropriate activation.*

Routine Maintenance

The SGAES-TG Gas Detection System needs very little routine maintenance; but periodic checks for proper system function and calibration are strongly advised. The frequency of these checks should be determined by the specific installation.

Although the fault-detection circuitry continuously monitors for various problems, it does not monitor external response equipment or wiring. These devices must be checked periodically in the Normal mode to ensure proper functioning.

Manual Check of Output Devices

Fault detection circuitry continuously monitors for a sensor problem, excessive negative zero drift, wiring problems, and various other problems that could prevent proper response to a dangerous level of gas. It does not monitor external response equipment or the wiring to these devices. It is important that these devices be checked initially when the system is installed, as well as periodically during the ongoing maintenance program.

Checkout in Normal Mode

The system must be checked periodically in the Normal Mode to ensure that those items not checked by the controller diagnostic circuitry are functioning properly.

! Warning: *Be sure to secure all output devices that are actuated by the system to prevent unwanted activation of this equipment, and remember to place these same output devices back into service when the checkout is complete.*

***Gas Detector
Maintenance***

For maintenance of the SGOES Combustible Gas Detector and the SSS-903 Toxic Gas Detector, please refer to the operating manuals, as applicable, for these detectors:

- SGOES Combustible Gas Detector Operation Guide (80014-001 R01)
- SSS-903 Toxic Gas Detector Operation Guide (80016-001 R01).

It is recommended that power be removed prior to performing maintenance, repair or replacement.

A Recommended Test Form is supplied in Appendix G of this manual.

9.0 Transportation and Storage

Transportation When shipped in the factory-supplied carton, the SGAES-TG Gas Detection System can be shipped via any method of transportation from the manufacturer's site to any destination regardless of distance.

Storage Until use, store the detector in the manufacturer's original carton. The storage facility should be free of dust, acid and alkaline vapors, corrosive gases and other harmful substances.

10.0 Warranties

ESP Safety Inc, 555 N. First Street San Jose, CA 95112 USA, guarantees the SGAES-TG 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 SGAES-TG system or replace any damaged unit free of charge.

Expected Service Life of Unit

The average expected life of the SGAES-TG system is no less than 10 years.

11.0 Repair and Return

Field Repair

The SGAES Gas Detection System is not intended to be repaired in the field. If a problem should develop, refer to Section 7.0 Troubleshooting of this manual. If it is determined that the problem is caused by a manufacturing defect, please return the device to the factory for repair or replacement.

Return Material Authorization (RMA) Number

Contact ESP Safety Inc at 408-886-9746 to obtain a Return Material Authorization (RMA) number. In the call, provide the following information:

- Company Name
- Serial Number
- Date of Commissioning
- A brief explanation of malfunction

Pack the unit properly to ensure that no shipping damage occurs and ship prepaid to:

ESP Safety Inc
555 N. First Street
San Jose, CA 95112

Write the RMA number on the front of the shipping carton.

! Note: *ESP Safety Inc recommends that an inventory of spare detectors be kept on hand to enable rapid field replacement and minimize downtime.*

12.0 Parts Ordering Information

The following items for the SGAES-TG system may be ordered:

- SSS-903 Toxic Gas Detector, part number (10060-001)
- SGOES Combustible Gas Detector, part number (10050-001)
- Display UPES-903, part number (10060-002)
- Mounting rack
- Gas calibration kit
- Splash guard
- Calibration cup

Order from:

ESP Safety Inc
555 N. First Street
San Jose, CA 95112
Ph: 408-886-9746
Fax: 408-886-9757

Please note that shipping charges will be added to your order.

13.0 Certifications

The SGAES Gas Detection system meets the following certifications:

FM
Approvals
Hazardous
Locations



Class I, Division 1, Groups B, C & D, IP 66

CE



Certificate of Conformity: CE Mark for EMC (TUV)
CE Mark for IECEx

ABS



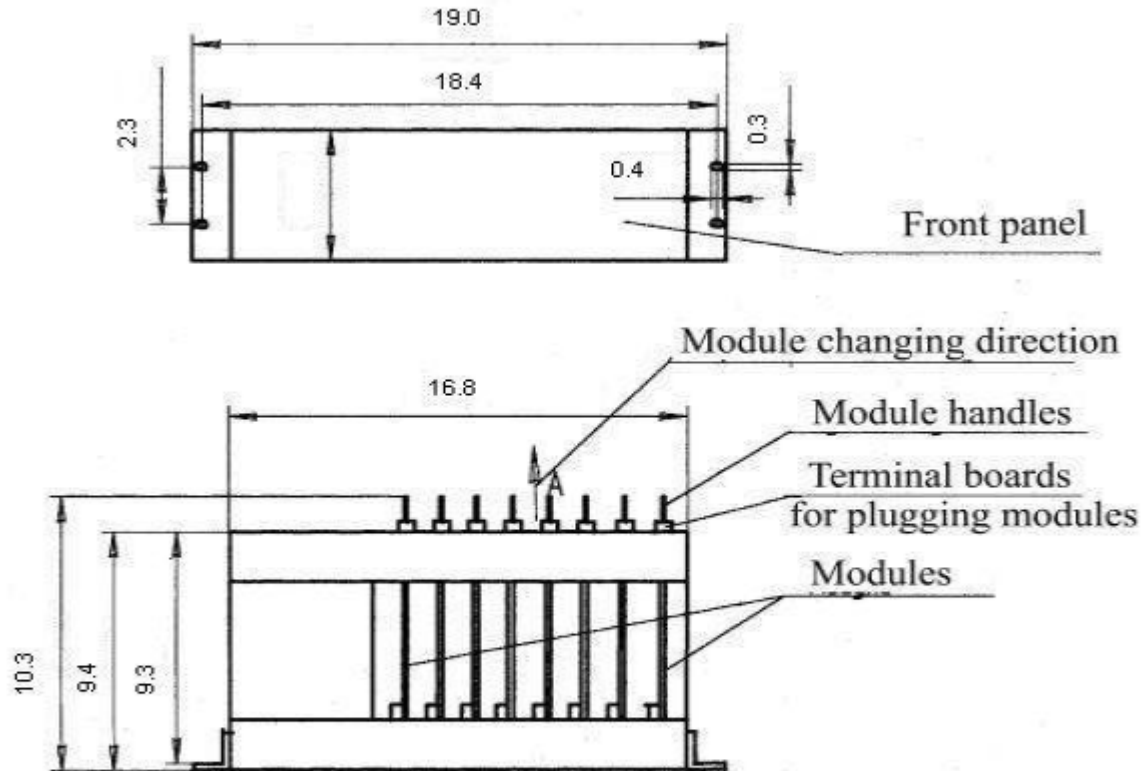
Class I, Division 1, Groups B, C & D,
T4 Ta = -40°C to +85°C
IP66

IEC/
IECEx

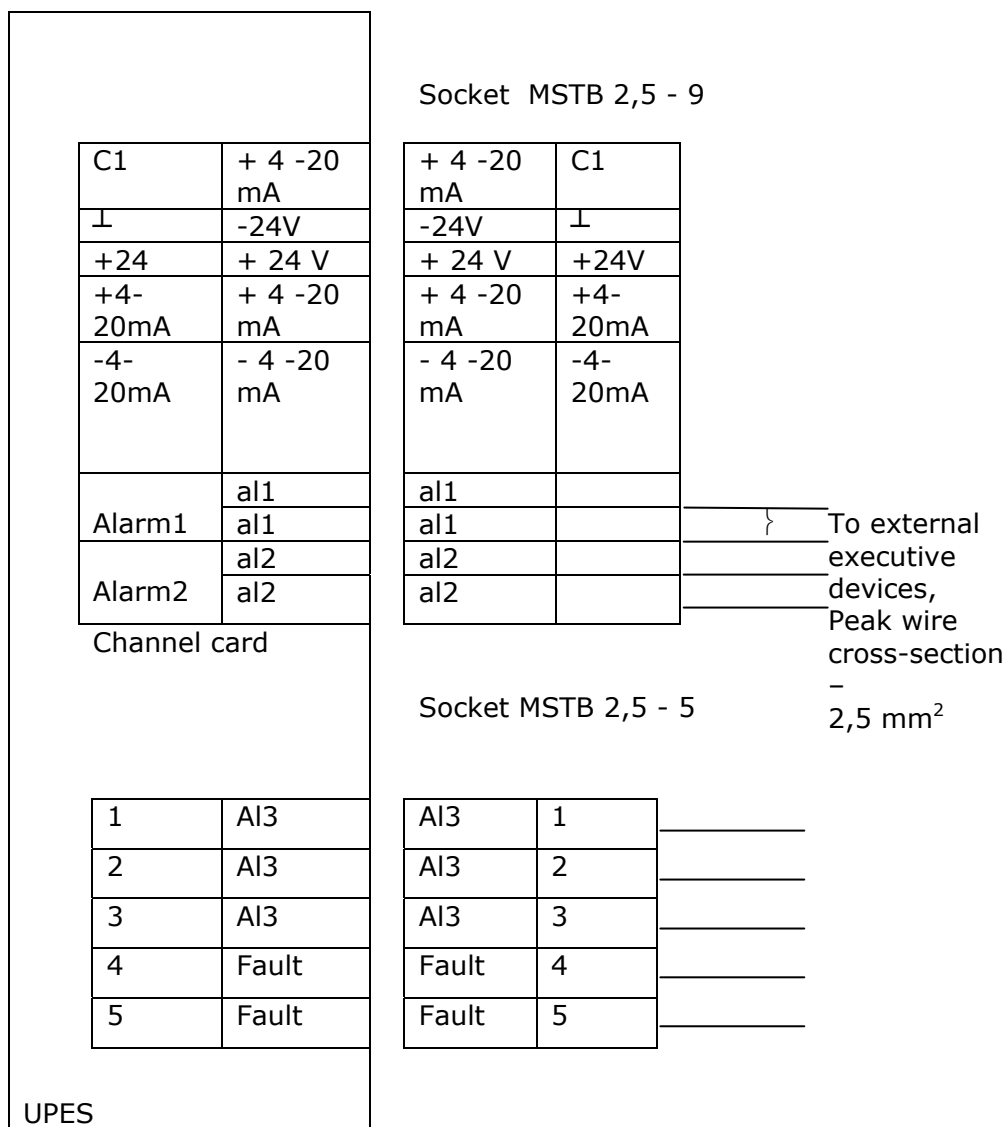


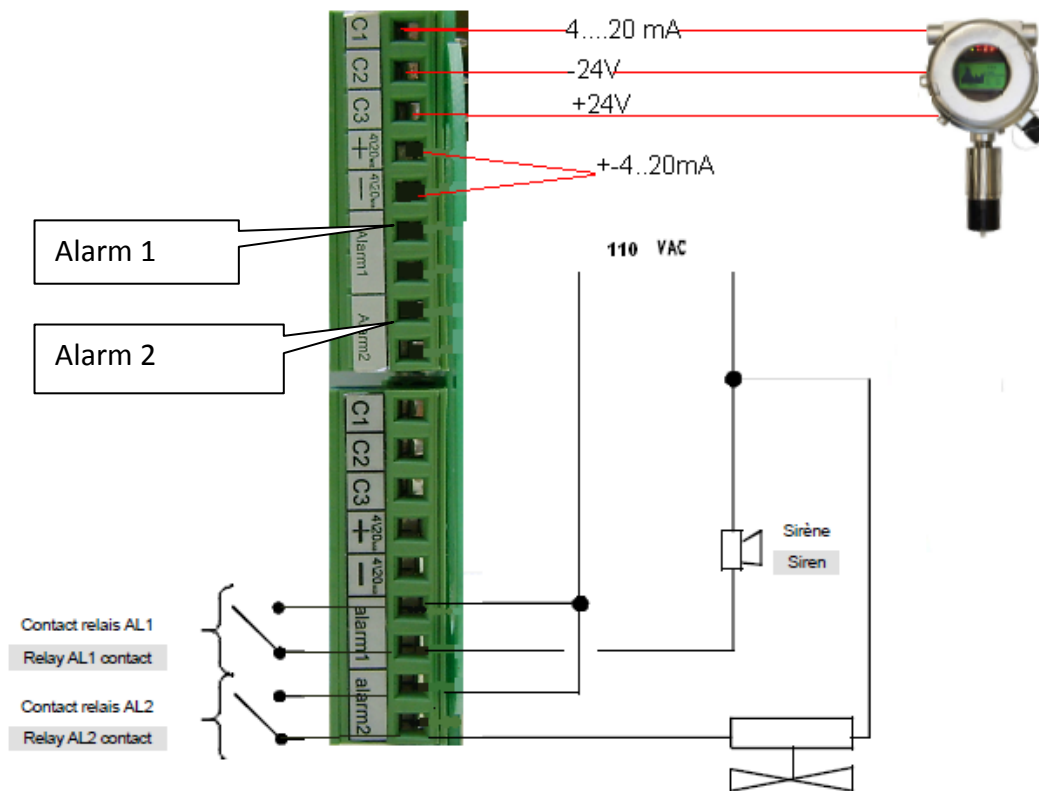
Flameproof "d"
Ex B IIC T4 Ta = -40°F to +185°F (-40°C to +85°C)

Appendix A – UPES Dimensions



Threshold device UPES in as a standard block type 3U19
designed for placing in the rack

Appendix B – UPES Relay Connections**UPES Relay Connections**



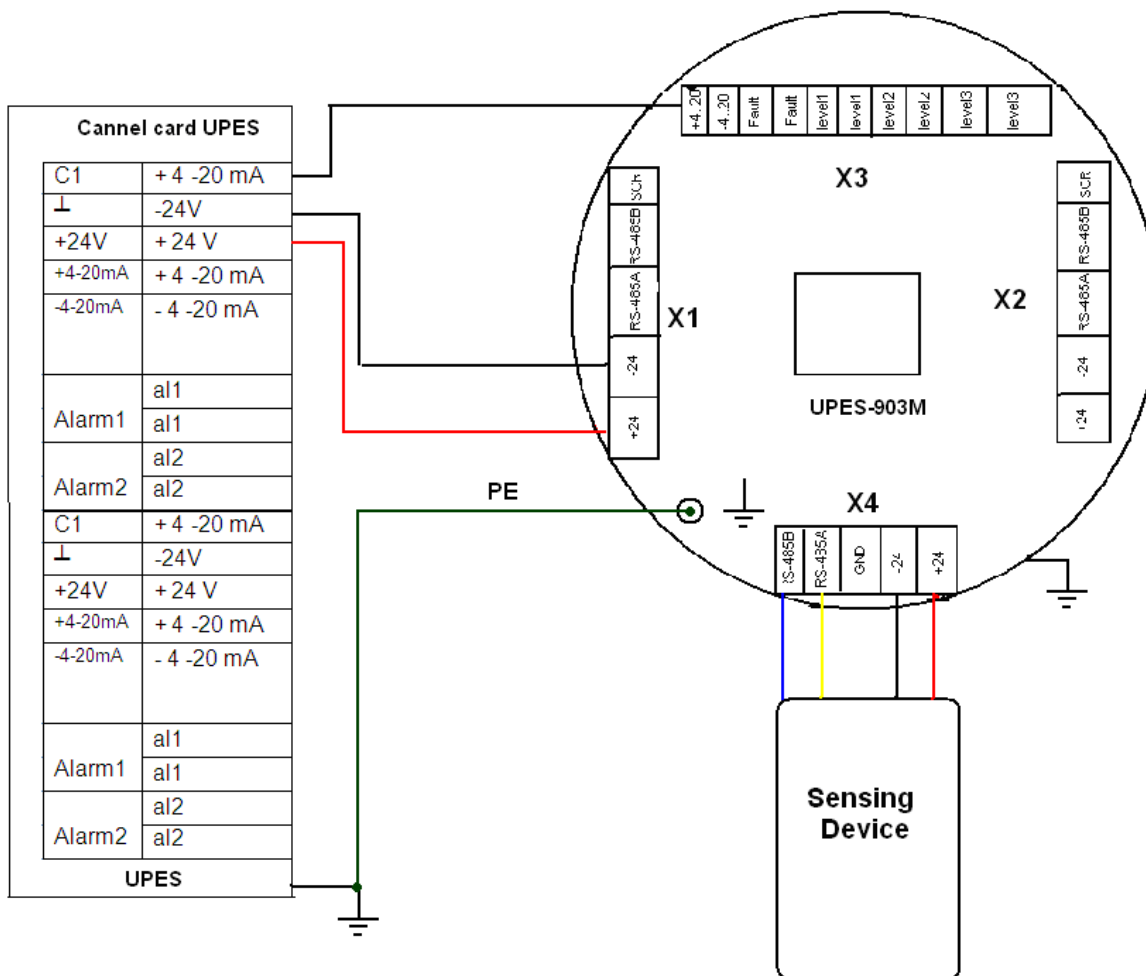
UPES Contact Relays

al1	Contact relay I alarm channel
al2	Contact relay II alarm channel
al3	Contact relay III alarm channel (common for all channel)
Fault	Fault contact relays(common for all channel) normally open
Contact relay parameters: Current up to 5A at 250VAC and up to 5A at 30VDC.	

Appendix C – Gas Detector Connections

Connecting the SSS-903

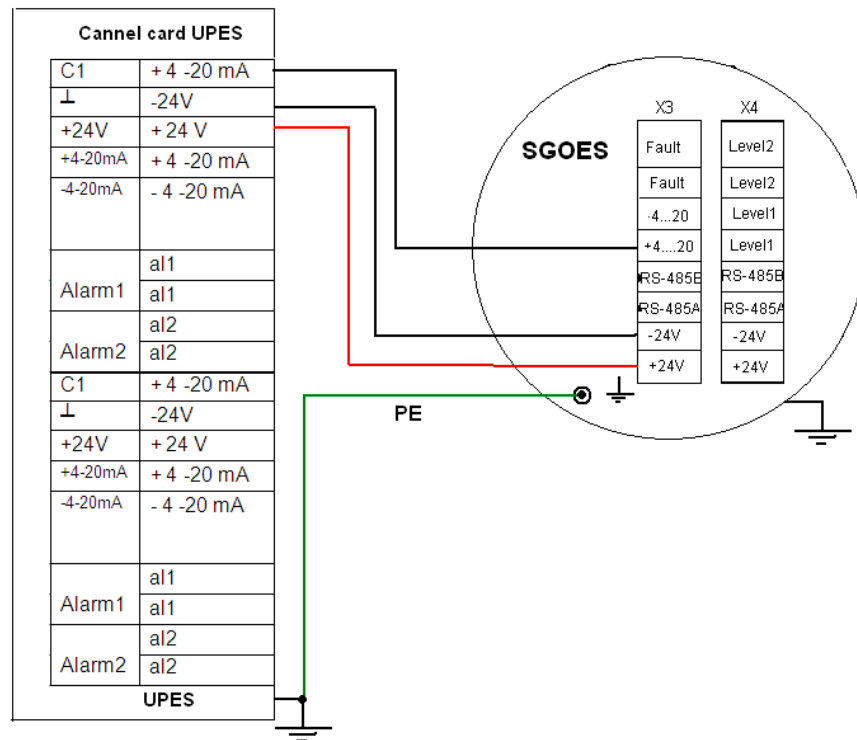
Refer to the schematic below in connecting the SSS-903 Toxic Gas Detector.



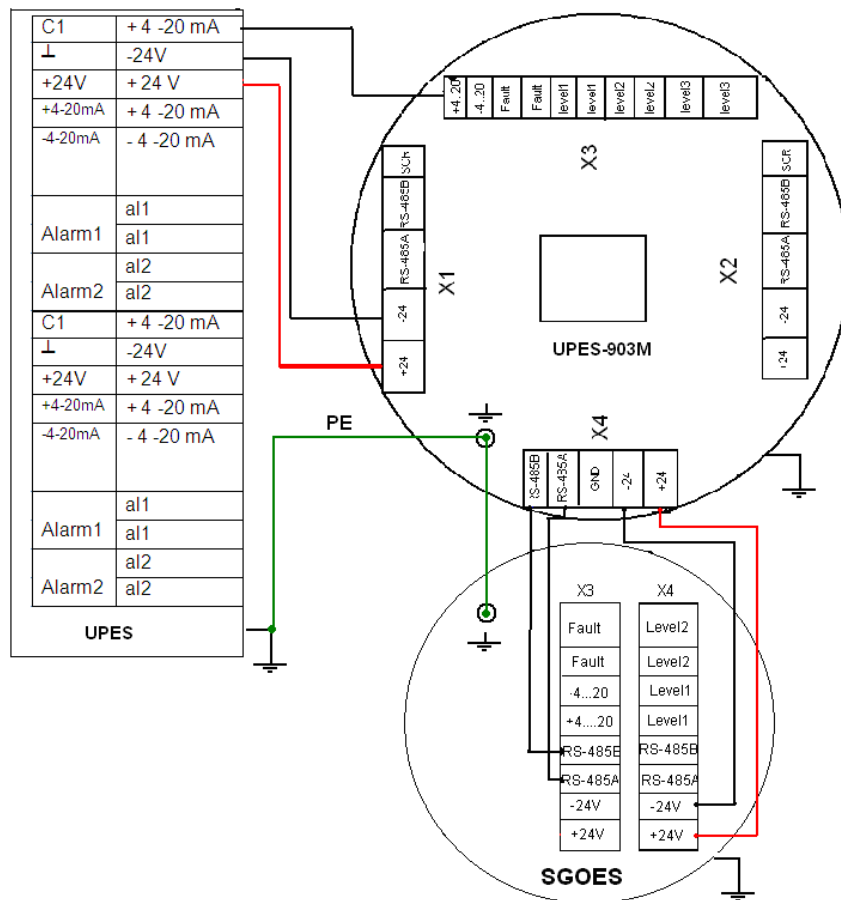
System Connection for the SSS-903

**Connecting the
SGOES**

Refer to the schematic below in connecting the SGOES.

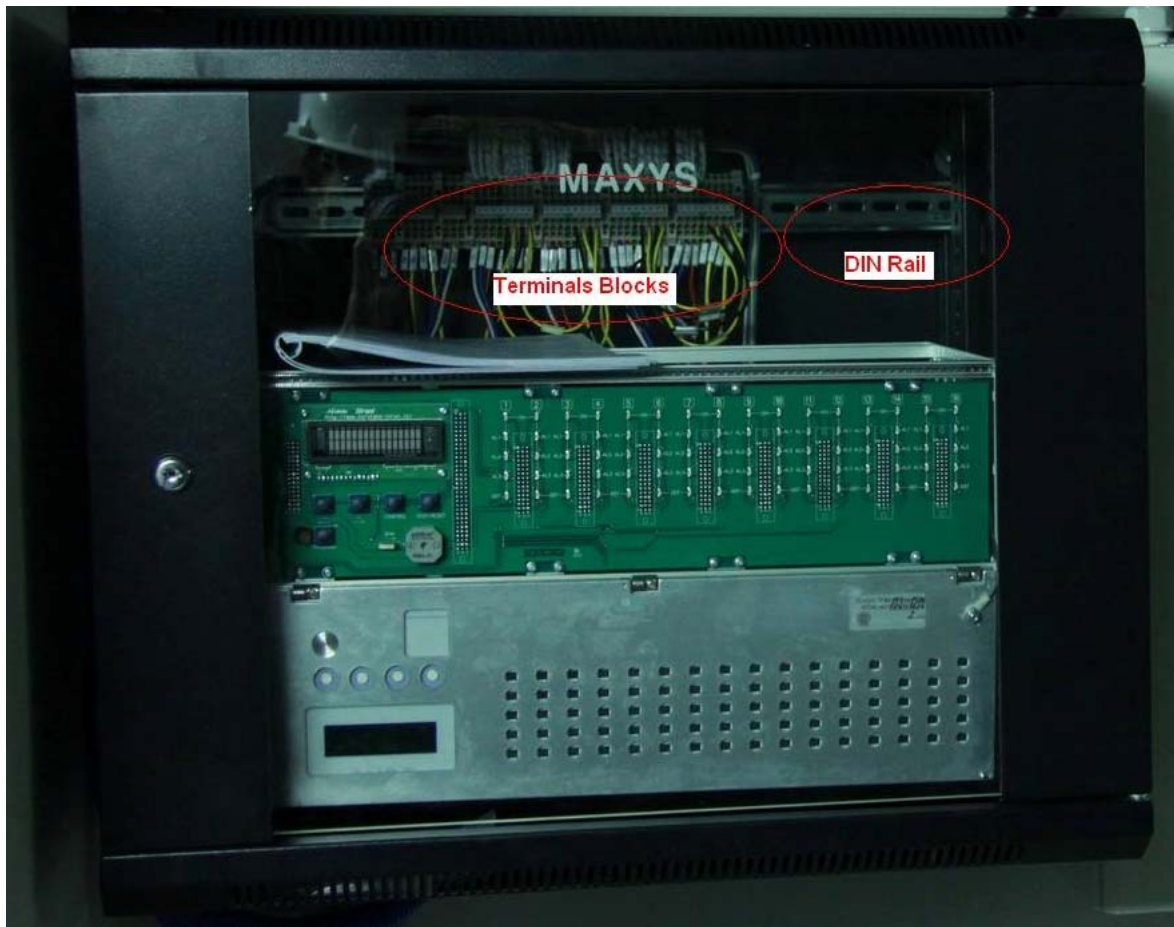
**System Connection for the SGOES**

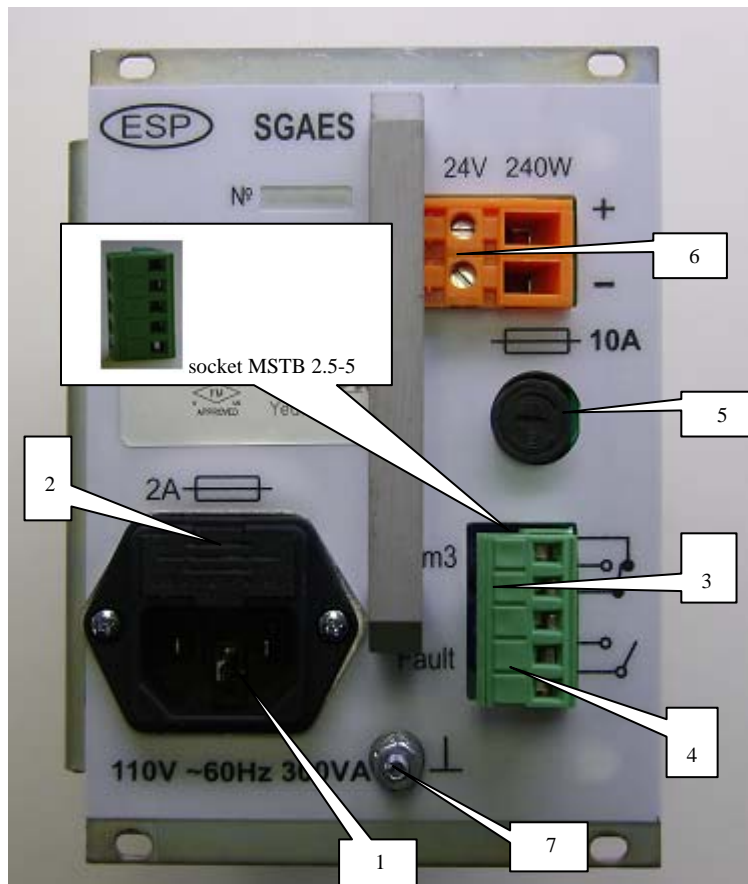
Refer to the schematic below in connecting the UPES-903 with SGOES.



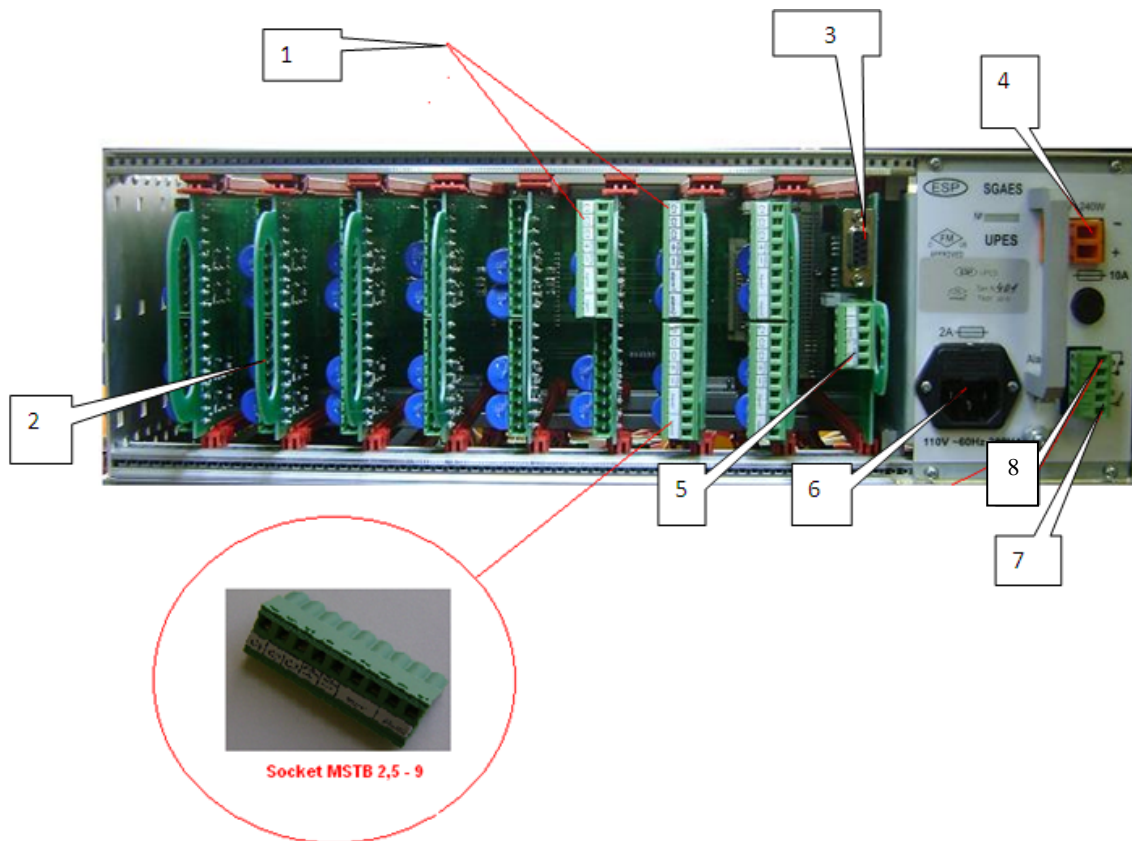
System Connection for Display UPES-903 - SGOES

Appendix D – UPES Mounting Rack

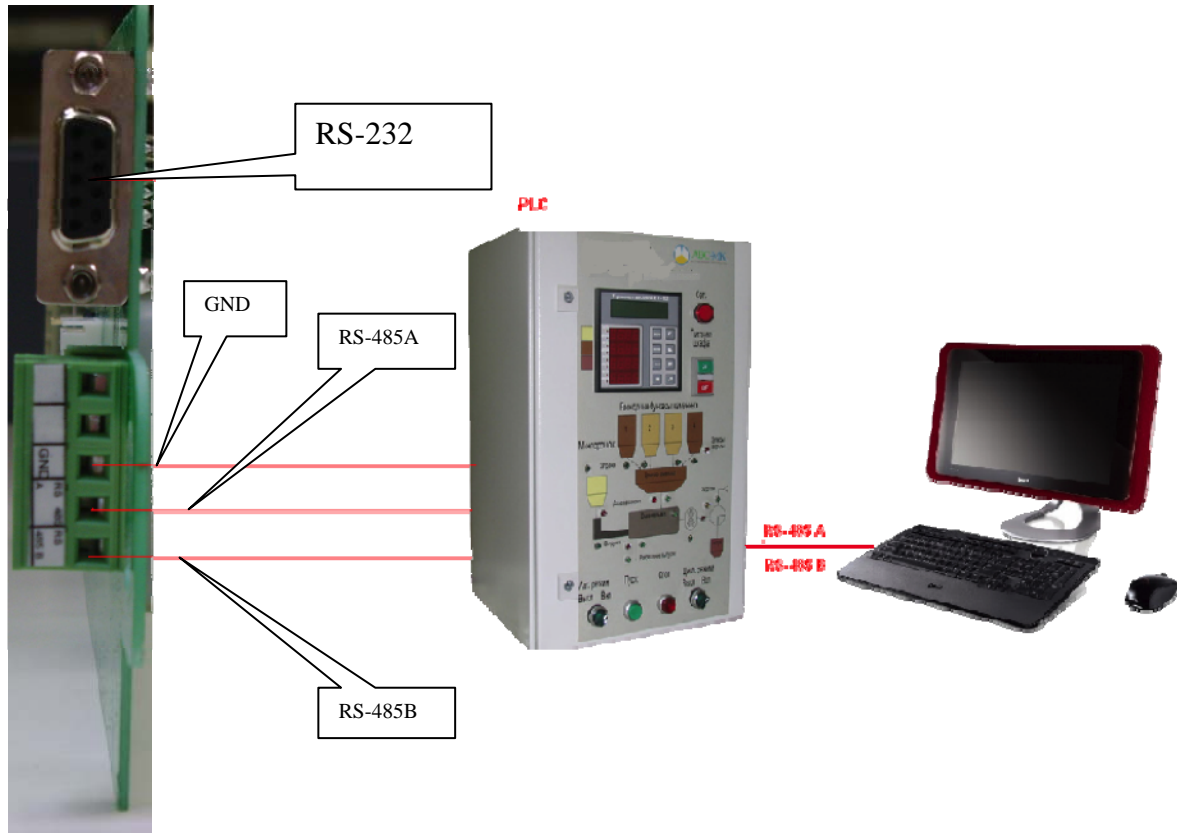


Appendix E – UPES Power Block / Grounding

- 1 - Basic power circuit, input 110V, 60Hz.
- 2 - Safety device power supply of 2A.
- 3 - 3rd alarm level relay contacts (common for all 16 channels)
- 4 - Fault relay contacts (common for all 16 channels)
- 5 - Safety device power backup circuit of 10A
- 6 - Power backup contacts
- 7 - Controller ground

Appendix F – Rear View of UPES and Processor Board

- 1 - Screw terminal connectors
- 2 - Measuring channel board
- 3 - RS-232 output
- 4 - Terminals for power backup
- 5 - RS-485 contacts output
- 6 - Power input 110V
- 7 - The 3d alarm level relay contacts (common for all channels)
- 8 - Fault relay contacts

Processor Board

[illegible]