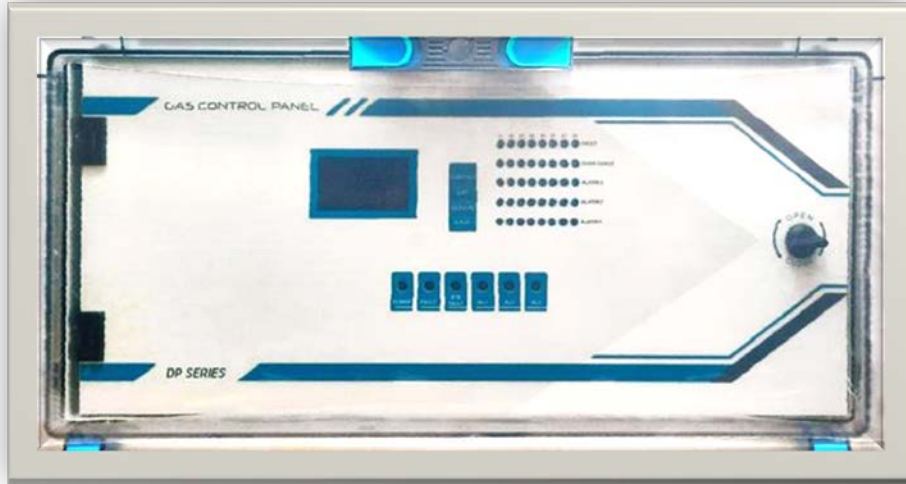




**PROSENSE
DPX Series
Gas Control Panel
User Manual
DPX (4 / 8 / 32 / 64 / 128)**



Prosense Teknoloji San. Ltd. Şti.
Cumhuriyet Mah. Mermer sok. No:16 34876 Kartal/İstanbul
Tel: (90) 216 306 77 88 Faks: (90)216 473 81 29
www.prosense.com.tr

WARNING!

READ THIS INSTRUCTION FIRST!

This manual must be carefully read by all persons who have or will have the responsibility for installing, using or servicing this product.

Like any equipment, this product will perform as designed only if installed, used and serviced in accordance with the manufacturer's instructions. Otherwise, it could fail to perform as designed and persons who rely on this product for their safety could suffer severe personal injury or death.

The warranties made by Prosense with respect to this product are voided if the product is not installed, used and serviced in accordance with the instructions in this user guide. Please protect yourself and other by following them.

WARNING!

Inductive or capacitive loads like motors, ventilation, e.g. should not be directly connected to the panel directly. In such cases, auxiliary external relays should be use to drive these loads.

Contents

1	Introduction.....	5
2	Technical Specifications.....	6
3	Panel Dimensions	7
4	Installation.....	8
5	Connections.....	11
5.1	MODBUS and Siren Outputs:.....	12
5.2	Analogue Channel Inputs:	13
5.3	Relay Outputs	14
5.4	MODBUS Channel Inputs:.....	16
5.5	Power Inputs:	18
5.5.1	Main Power Connection	19
5.5.2	Backup Battery Connection.....	19
5.6	Fuses.....	20
5.7	Analogue Input Module.....	20
5.8	Relay Output Module	23
6	Indicators.....	26
6.1	Display:	27
6.2	Special States.....	29
6.3	Warm-up Status:	29
6.4	Fault Status:.....	30
6.5	Overrange Status:.....	30
6.6	Alarm Status:	31
7	Programming.....	32
7.1	Panel Configuration:.....	33
7.1.1	Setting Up Network Parameters:	33
7.1.2	Setting Up Date and Time:	34
7.1.3	Setting Up Passwords:.....	35
7.1.4	Setting Up Language:.....	35
7.1.5	Setting Up Battery:	36
7.2	Detector Settings:.....	37
7.2.1	Analogue Detector Configuration:	37
7.2.2	Analogue Detector Alarm Settings:	39

7.2.3	4-20mA Settings:	40
7.2.4	Event Relay:	41
7.2.5	MODBUS Detector Configuration:.....	42
7.2.6	MODBUS Detector Alarm Settings:	43
7.2.7	MODBUS Detector Calibration:	45
7.3	Relay Settings:	47
7.3.1	On Board Relay Settings	47
7.3.2	Remote Relay Settings.....	48
7.3.3	Relay Module ON/OFF.....	49
7.4	Test Options:	50
7.5	Information:	51
7.6	Resetting Alarms:	53
7.7	What to Do In Case Of Alarm	54
7.8	Failure Codes:	55
8	Declaration	57
9	Appendix-A – Prosense Gas No Index	58
10	Warranty statement	59
10.1	Exclusions	59
10.2	Warranty Limitation and Exclusion	59
10.3	Limitation of Liability	59

1 Introduction

Prosense DPX Series Gas Control Panel is able to provide automatic gas concentration reading and protection against gas explosions. The control panel is intended for the continuous measurement and control of the gases present in the atmosphere. DPX Series Gas Control Panel built as a wall mounted system. Panel permanently transmits the gas concentration measurement from detectors and instantly handles the measurement of detectors. The control panel is able to generate sound and visual alarm, when measurements reach the programmed limit value.

Prosense DPX Series Control Panel has three levels of alarm which are adjustable according to the measuring range and one fault alarm for the detection loop. Individual relays per function ensure remote controlled output. There are 5 relays on the panel. Three of them used as alarm relays and configured as ALARM-1, ALARM-2 and ALARM-3. There is one FAULT relay to monitor overall fault status. An additional relay programmed for Overrange can be optionally adjusted to alarm status.

Prosense DPX Series Panel is configured in 5 different configurations:

DPX4	4 x 4-20mA Analogue Channels
DPX8	8 x 4-20mA Analogue Channels
DPX32	32 x RS485 MODBUS RTU Detectors + 8 x 4-20mA Analogue Channels
DPX64	64 x RS485 MODBUS RTU Detectors + 8 x 4-20mA Analogue Channels
DPX128	128 x RS485 MODBUS RTU Detectors + 8 x 4-20mA Analogue Channels

Table 1: DPX Series Panel Models

DPX Series Gas Control Panel provides option for creating logical zones for independent detectors to build similar infrastructure of the real detector location at panel side.

DPX Series Gas Control Panel has 128x64 OLED screen on the front panel to show status of each detector. This screen and menu keys allow user to set correct properties for each detector like gas concentrations by gas type, measurement type, measurement range and alarm levels.

DPX Series Gas Control Panel complies to IEC 60079-0:2017 and IEC 60079-29-1:2016 standard requirements. Please refer to the certification label on the control panel to identify the type of certification that relates to the product supplied.

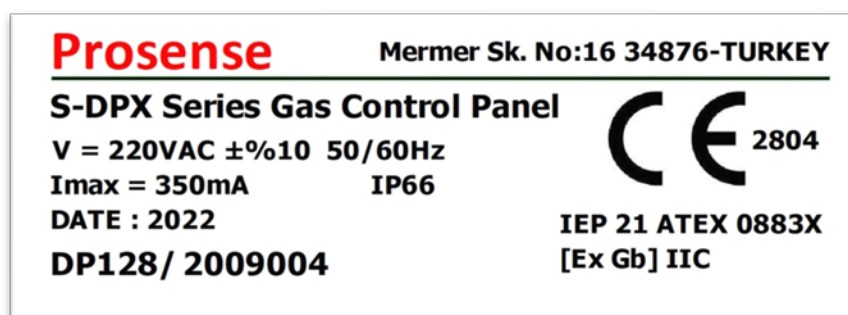


Diagram 1:Panel Label

The model and serial number of the product given with “DP128/???????” numbers.

2 Technical Specifications

Power Source	220VAC
Power Consumption	27VDC/250mA - 6.75W max. (without connected detectors)
Inputs	DPX4 : 4 x Analogue input
	DPX8 : 8 x Analogue input
	DPX32 : 2 x MODBUS input (16 + 16) + 8 x Analogue input
	DPX64 : 2 x MODBUS input (32 + 32) + 8 x Analogue input
	DPX128 : 2 x MODBUS input (64 + 64) + 8 x Analogue input
Relay Outputs	FAULT, ALARM1, ALARM2, ALARM3, OVERRANGE (optional programmable relay)
Contacts rating	3A, 24VDC
Display	Graphic OLED (128x64)
LED indicators	FAULT, ALARM1, ALARM2, ALARM2, OVERRANGE status LEDs for each zone (40 LEDs)
	Power/On, FAULT, ALARM1, ALARM2, ALARM3, SYS-FAULT LEDs for overall monitoring
Audible indicators	Internal buzzer
Audible Output	Siren 24VDC/2A
Network Output	Ethernet-RJ45 / MODBUS over Ethernet (optional)
MODBUS Output	RS485 MODBUS RTU Output for external device communication
Backup battery	2 x 12V 7A/h (Optional)
Operating Temp.	-10 : 60 °C
Humidity	15 - 95% non condensing
Housing	ABS IP66 (546 X 276 X 186 mm)
Weight	DPX4: 4kg
	DPX8, DPX32, DPX64, DPX128: 6kg
Main power fuse	2A
Backup battery fuse	2A
Warm-up time	Up to 2 minutes
Delay time	Panel can recognize any special state in 2 minutes
Special States	Fault (Fault Relay is de-energised)
	Alarm (Alarm Relays are energised)
	Overrange (Overrange Relay is energised)
EMC conformity	EN 61326-1 Group-1 Class-A
IEC conformity	IEC 60079-29-1:2106
ATEX conformity	IEP 21 ATEX 0883X
ATEX Label	[Ex Gb] IIC
Program Release	V3.02.1.03
Special condition	Do NOT install in hazardous area
Event log	Up to 500 records
Clock battery	RTC 3V/10mA

Table 2: Technical specifications

3 Panel Dimensions

Panel dimensions are different for DPX4 and other models. DPX4 panel dimensions are explained in Diagram-2:

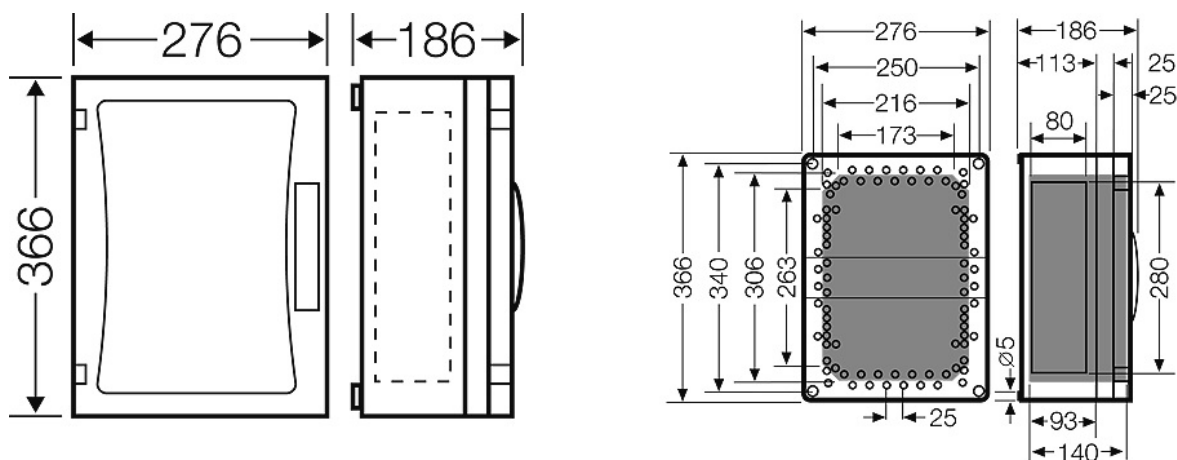


Diagram 2: Dimensions (mm)

DPX8, DPX32, DPX64, DPX128 Panel dimensions are explained in Diagram 3:

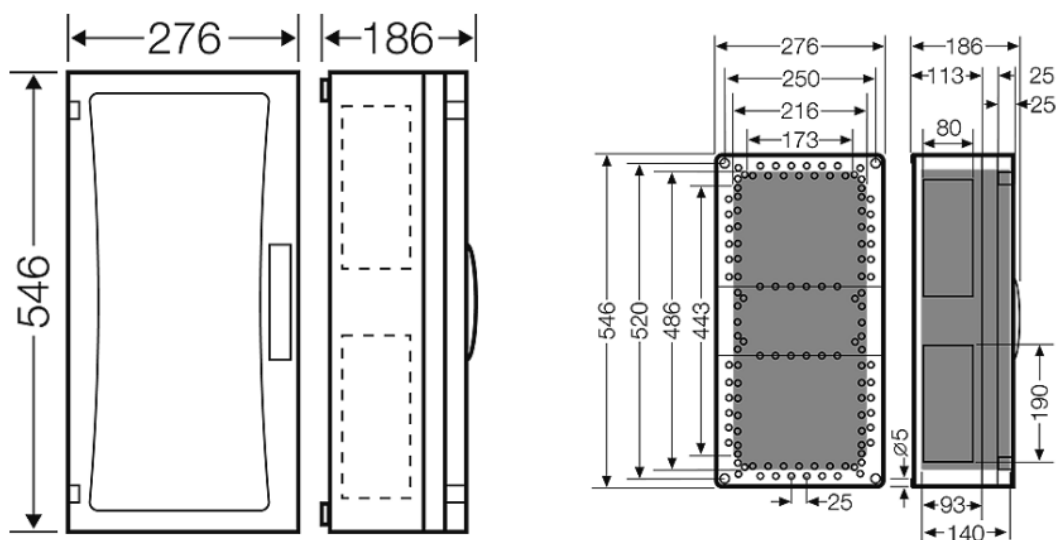


Diagram 3: Dimensions (mm)

4 Installation

The DPX Series Gas Control Panel should never be placed in an explosive atmosphere and should be readily accessible. It is necessary to drill holes for cable glands either on the top or bottom of the control unit, depending on which side the electric cables are running in. Before drilling any holes you can unscrew and remove the electronic parts to avoid accidentally damaging it. DPX Series Gas Control Panel should not be placed nearby high voltage cables or power cable, coaxial cables or transmitters, welding stations or frequency regulators.

DPX Series Gas Control Panel box produced based on IP66 standard specifications. Always use the screw holes to mount it and do not pierce panel from any other side. Always use cable glands to make cable entries.

S-DPX4 panel has 4 plastic screws keeping panel door in place in front of panel. Use a flat screwdriver to lose them and remove the panel door assembly. Please take care and remove the connectors on the electronic card while removing the cover. Fix the panel on to the wall via using 4 screw holes in each corner after removing the front cover. M4 screws are suitable to fix the panel body to the wall. Once wall mounting completed reattached the front cover and tighten 6 plastic screws.



Diagram 4: Panel cover plastic screw

To prepare cable entries, remove plastic cover from top or bottom on the panel. Then drill the holes for cable entry and install cable glands to the holes you made it. Make sure you are using an adequate IP66 rate cable gland to assure the box ingress protection is not compromised. The panel box is modular and can be used with different assemblies. Prosense recommends having cable entries from the lower side. Electronic board is located in the front cover of the panel. The power supply is located at the back of panel box. The power must be connected to this power supply. If the installation requires the connection to a backup battery, place the battery to lower right side of the panel inside.

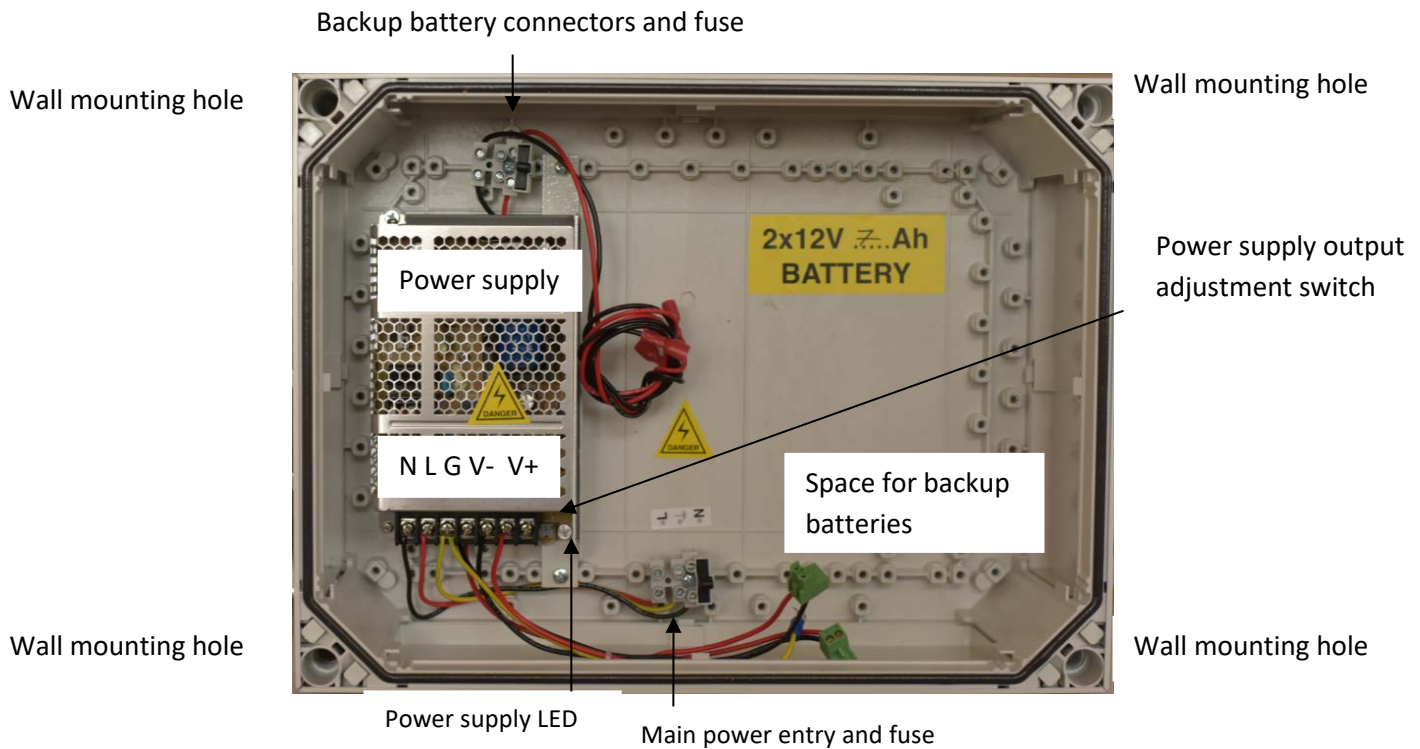


Diagram 5: Panel body

DPX8, DPX32, DPX64, DPX128 panel has 6 plastic screws on the front of panel. Use a flat screwdriver to lose them and remove the cover part on the front. Please take care and remove the connectors on the electronic card while removing the cover. Fix the panel on the wall via using 6 screw holes after removing the front cover. Reattached the front cover and tighten 6 plastic screws when wall mounting completed.

To prepare cable entries, remove plastic covers from top or bottom on the panel. Then drill the holes for cable entry and install cable glands to the holes you made it. Make sure you are using an adequate IP66 rate cable gland to assure the box ingress protection is not compromised. The panel box is modular and can be used with different assemblies. Prosense recommends having cable entries from the lower side. Electronic board is located in the front cover of the panel. The power supply is located at the back of panel box. The power must be connected to this power supply. If the installation requires the connection to a backup battery, place the battery to lover right side of the panel inside.

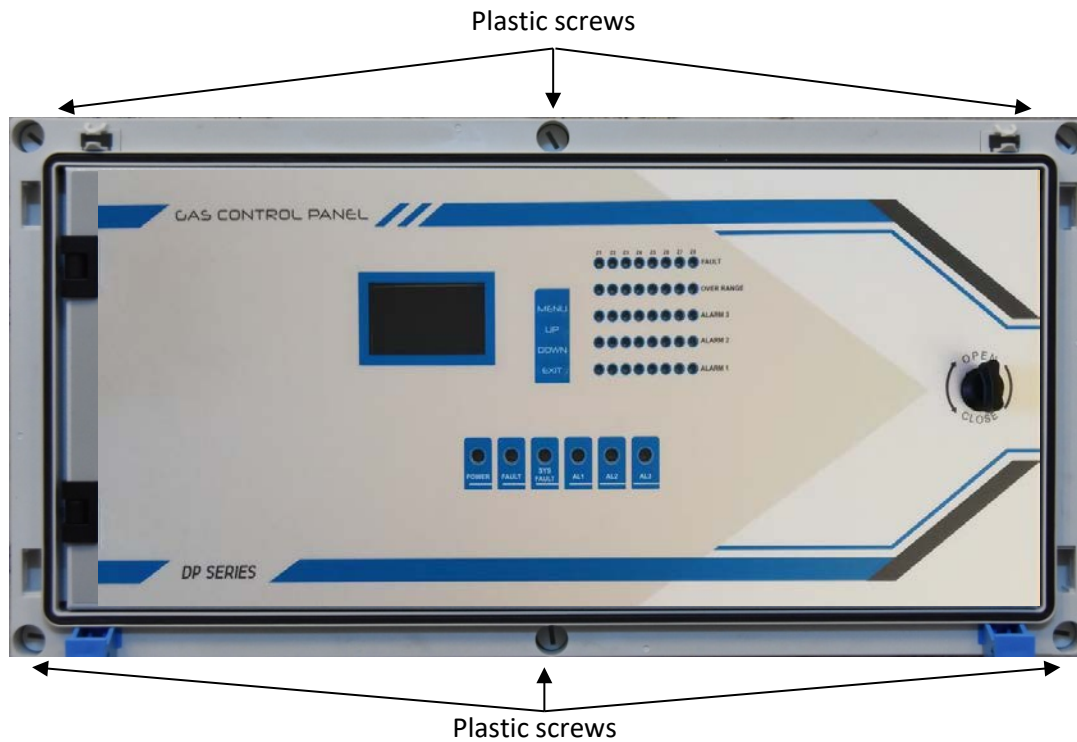


Diagram 6: Panel cover plastic screw

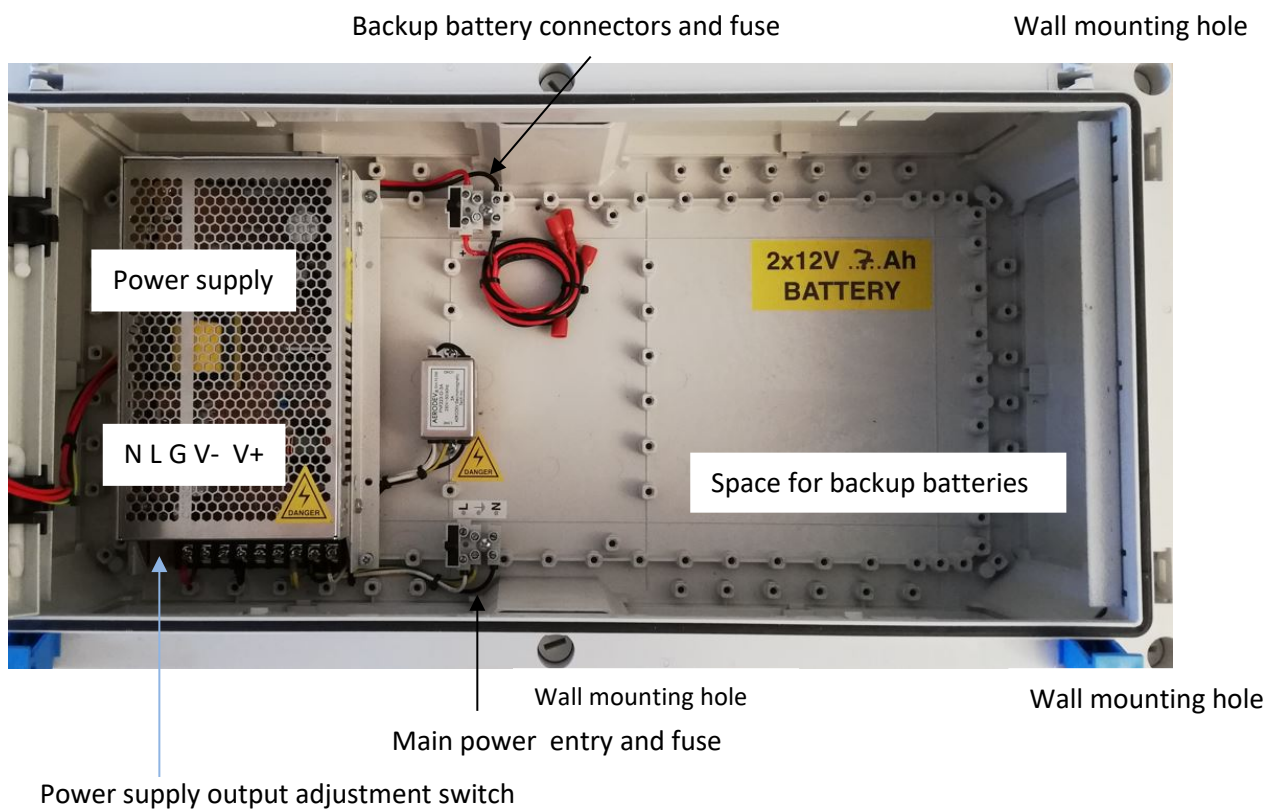


Diagram 7: Panel body

5 Connections

DPX Series Gas Control Panel connections must be done on main board.

The main building blocks of the panel PCB are pointed with letters on picture. Their meaning and details are as follows:

A	MODBUS and Siren Outputs
B	Analogue Channel Inputs
C	Relay Outputs
D	MODBUS Channel Inputs
E	Power Inputs
F	Ethernet Output (Optional)

Table 3: Main board sections

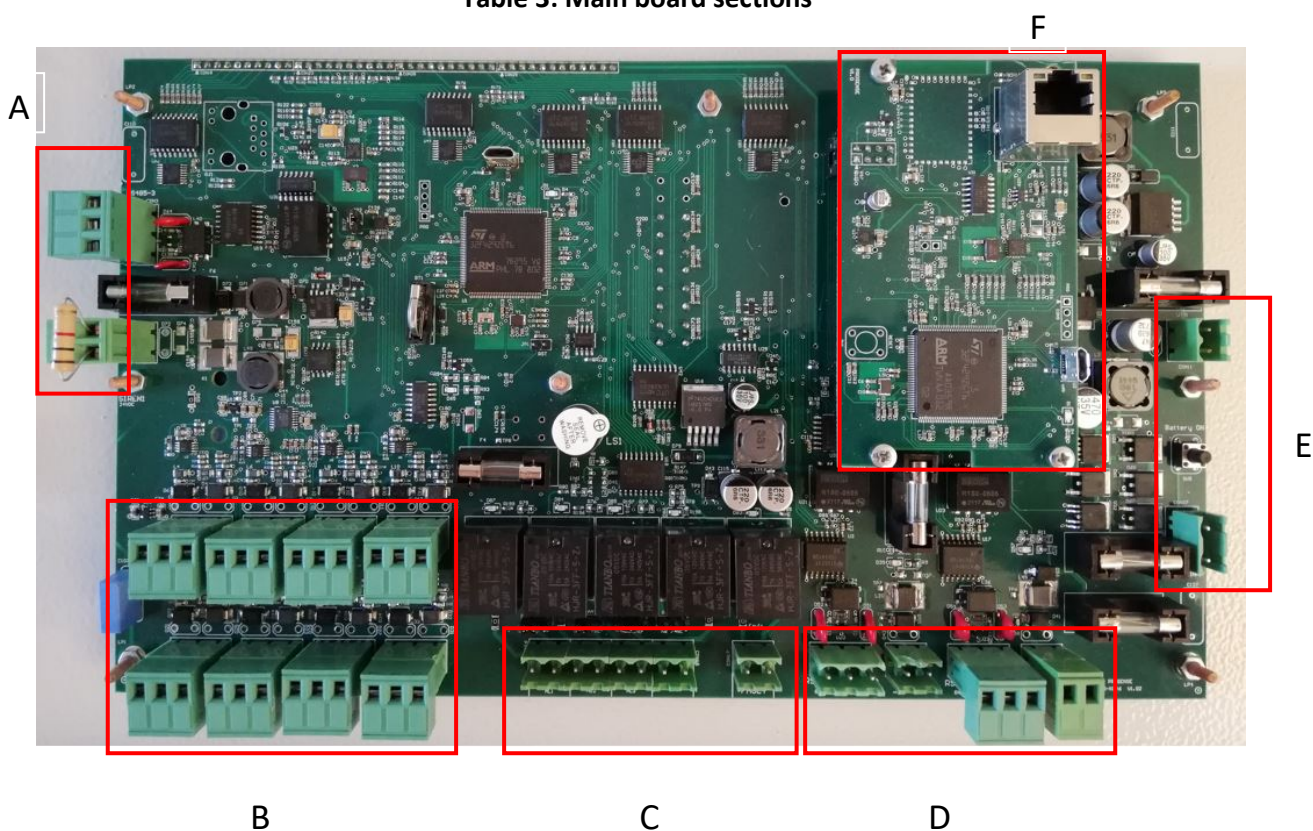


Diagram 8: Control panel main board

5.1 MODBUS and Siren Outputs:

DPX Series Gas Control Panel provides RS485 MODBUS interface to communicate external devices or computers. Prosense Panel Monitor Software can be used to configure panel parameters and monitor the panel status through MODBUS communication. This Interface is marked as RS485-3 on main PCB board.

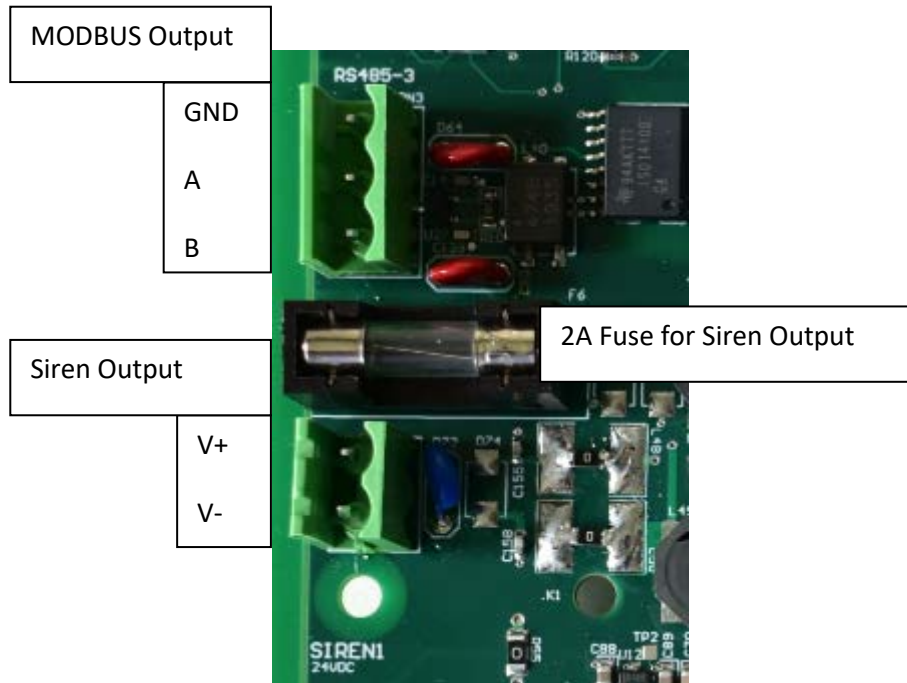


Diagram 9: Control panel Modbus and Siren outputs

The Siren output provides 24VDC output to drive a sounder device. If panel is in normal condition it does not provide power. It only provides power when power went in to fault or alarm status. In case of alarm or fault user can disable this output temporarily via pressing the MENU button. Panel waits five minutes and perform control again. If there is still alarm or fault condition on panel it automatically activates output again to generate audible alarm. Panel itself has also a buzzer on main board. Siren output is specially designed to provide external audible alarm.

1K resistor should be placed between V + and V- pins of the SIREN1 port to the external siren output. Otherwise, the panel will not be able to check the port status, so it will set an error for this port. In case there is more than one sounder, 1K resistor should be added to the last siren output

.

5.2 Analogue Channel Inputs:

DPX series Gas Control Panel has analogue channel inputs to connect detectors via using 4-20mA output. DPX4 Panel has 4 analogue channel inputs while DPX8 Panel will have 8 analogue channel inputs.

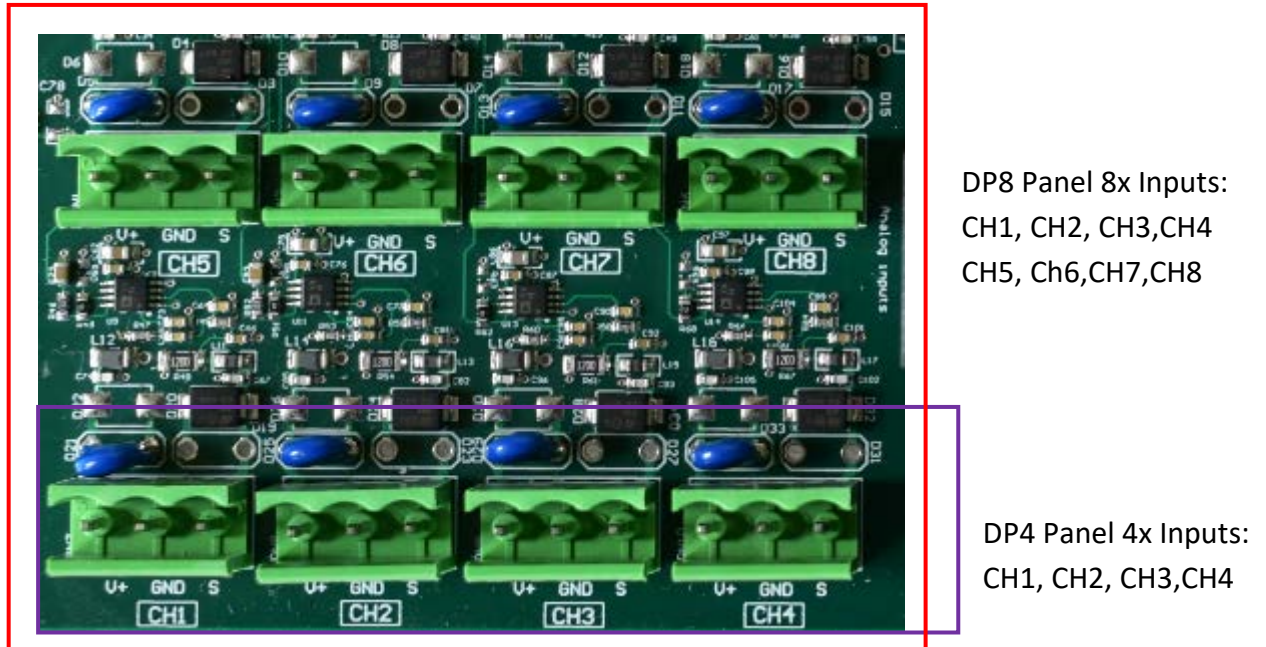


Diagram 10: Analogue Channel Inputs

Panel must be connected to detectors through V+, V-(GND) and S via using three-wire cable. Panel channels supply 24VDC power to detector and read the output signal of detector from S port. Thus connections should be made correctly to do not cause any damage on the detectors. Detector connections should be made with 3 core cable and pin definitions are as follows:

Detector Pin	Panel pin	Meaning
S	S	4-20mA signal
V-	GND	GND (V-)
V+	V+	Supply (V+)

Table 4: Connection pin definitions

A sample connection schema is shown in below figure:

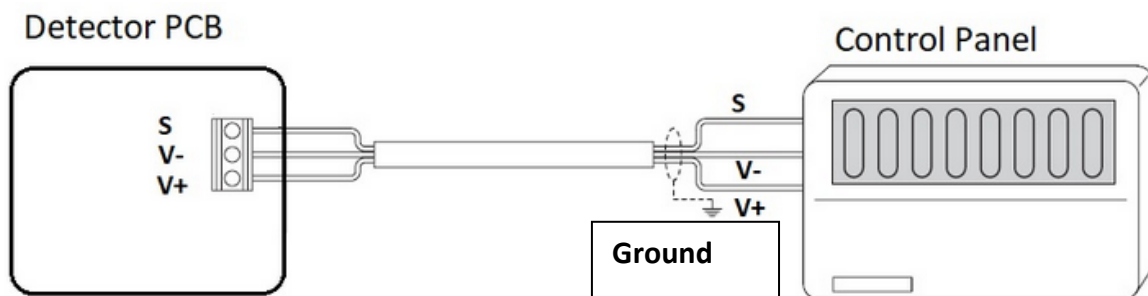


Diagram 11: Panel – Detector 4-20mA connection

Detectors should be connected with three-wire 1.5mm² cross section cable. Cable diameter will be increased while distance increase between the panel and detectors. Recommended cable types per distance are given in table 6:

Cable size (cross sectional area)	Cable type nearest equivalent	Cable resistance Ω/km	Maximum Cable length (L) Meters
0.5mm ²	20AWG	36.8 Ω/km	400
1.0mm ²	17AWG	19.5 Ω/km	750
1.5mm ²	16AWG	12.7 Ω/km	1000
2.0mm ²	14AWG	10.1 Ω/km	1250
2.5mm ²	13AWG	8.0 Ω/km	1500

Table 5: Typical cable details and maximum distance for cabling

The use of industrial grade, suitably shielded field cable is recommended. The best practices shown that, screened 3 cores (plus screen 90% coverage), suitably mechanically protected copper cable with a suitable explosion-proof gland, or ¾" NPT steel conduit, depending on the distance between signal received or control panel and detector 0.5 to 2.5 mm² (20 to 13 AWG) conductors can give better results. Ensure the cable gland is installed correctly and fully tightened.

5.3 Relay Outputs

DPX Series Gas Control Panel without any optional relay modules has five relay outputs which are FAULT, ALARM1, ALARM2, ALARM3 and OVERRANGE. The connection ports are marked on mainboard.



Diagram 12: Relay Outputs

Relay contacts can be adjusted as normally Open or Normally Close. Mainboard has 3 pins for each relay to select relay contact mode via changing the jumper position:

NC : Normally closed contact pin (Select by jumper under relay)

NO : Normally open pin (Select by jumper under relay)

The relay output pin positions shown below:

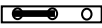
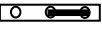
	Normally Open (NO)
	Normally Close (NC)

Table 6: Relay output pin positions

Fault Relay is always works in Normally Close mode and there is no selection pin for fault relay (Relay-1). If panel lost power user will always get switching contact from fault relay.

Relay numbers and related events are defined as below:

Relay No	Event	Monitoring area	Assignment
Relay-1	FAULT	All Zones and Panel itself	No alteration
Relay-2	ALARM-1	All Zones	No alteration
Relay-3	ALARM-2	All Zones	No alteration
Relay-4	ALARM-3	All Zones	No alteration
Relay-5	OVERRANGE	All Zones	Can be altered

Table 7: Relay assignments

Relay activation rules are as follows:

FAULT (RELAY-1): This relay will be activated when any of the detectors in the system is in fault status.

ALARM1 (RELAY-2): This relay will be activated when any of the detectors in the system will exceed the programmed AL1 level.

ALARM2 (RELAY-3): This relay will be activated when any of the detectors in the system will exceed the programmed AL2 level.

ALARM3 (RELAY-4): This relay will be activated when any of the detectors in the system will exceed the programmed AL3 level.

OVERRANGE (RELAY-5): This relay will be activated when any of the detectors in the system will exceed the defined measurement level.

Not: Relays should not be connected directly to devices using high current. The relay outputs should be used as control signal. In order to drive high load devices external relays should be used and panel relay outputs must be used to drive external relays.

5.4 MODBUS Channel Inputs:

DPX Series Gas Control Panel has two MODBUS channel input ports on main board:

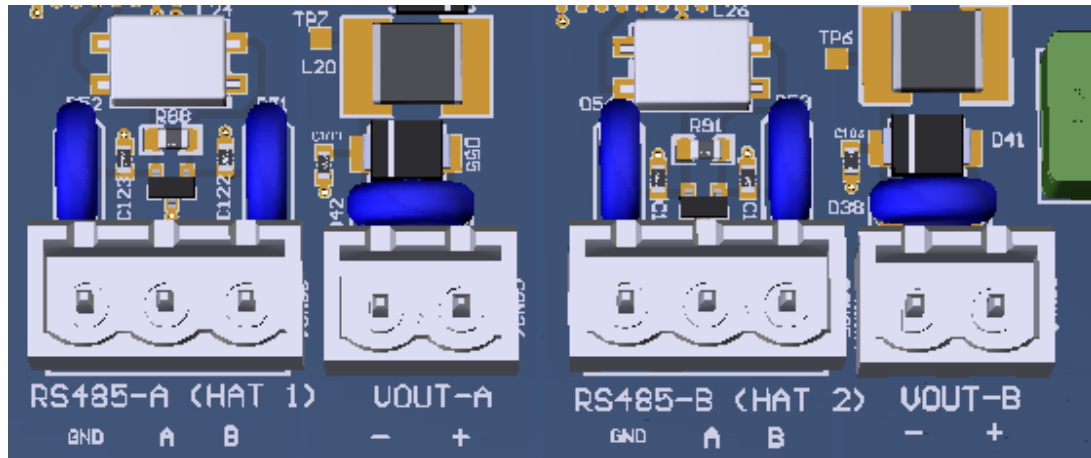


Diagram 13: MODBUS Channel Inputs

MODBUS Channel pin details are given in table XX:

Socket Label	SW name	Pins	Pin definitons
RS485-A	MODBUS Line 1	GND	Ground for MODBUS connection
		A	A Line for MODBUS communication
		B	B Line for MODBUS communication
VOUT-A	Power Output Line 1	+	V+ to supply detector power on Line 1
		-	V- to supply detector power on Line 1
RS485-B	MODBUS Line 1	GND	Ground for MODBUS connection
		A	A Line for MODBUS communication
		B	B Line for MODBUS communication
VOUT-B	Power Output Line 2	+	V+ to supply detector power on Line 2
		-	V- to supply detector power on Line 3

Table 8: MODBUS Channel pin definitions

DPX Series Gas Control Panel is a master device in the MODBUS Network and it initiates the communication with a “query” to “Slave” devices which are detectors. The “Slave “ which is constantly monitoring the network for “Queries” will recognise only the “Queries” addressed to it and will respond by returning a “response”. The connection topology will be as follows:

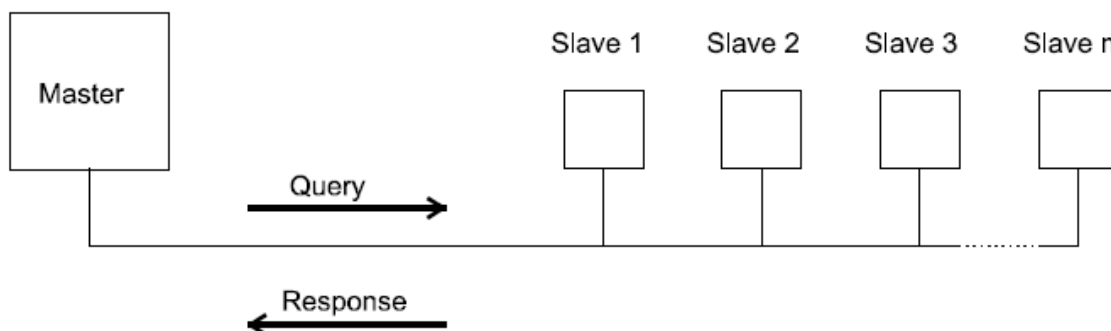


Diagram 14: MODBUS Communication

DPX Series Gas Control Panel can monitor detectors via RS485 serial connection. It can also provide power for detectors. V+, V-(GND), A and B ports must be connected via using four-wire cable. Detector connections supply 27VDC power to detector and read the output signal of detector from A and B ports. Thus connections should be made correctly to do not cause any damage on the detectors. Detector power connection should be done with 1.5mm² cross section cable. The total distance between control panel and detectors should not exceed 800 meters. Detector connections should be made with 4 core cable wire that 2 for power and 2 for RS485 and pin definitions are as follows:

Port	Type	Usage
V+	output	+24VDC to provide power for detector
V-	output	-VDC to provide power for detector
A	input	RS485 port A
B	input	RS485 port B

Table 9: Connection pin definitions

The wiring for detectors utilized with RS485 board should be done by using connection cable EIA RS485 2 core wires with section 0.22 / 0.35 mm² and shielded. Nominal capacity between the wires should be < 50pF/m and nominal impedance should be 120 Ohms.

The V+, V- ports and A, B ports are located different sockets in DPX Series Gas Control Panel main board. These ports are also formed in different sockets on Prosense detectors. The connections should be done with care to do not mix power and RS485 ports. All detectors will be connected through one cable via hopping one detector to another till the last detector on the line. The connection schema is given in Diagram 11:

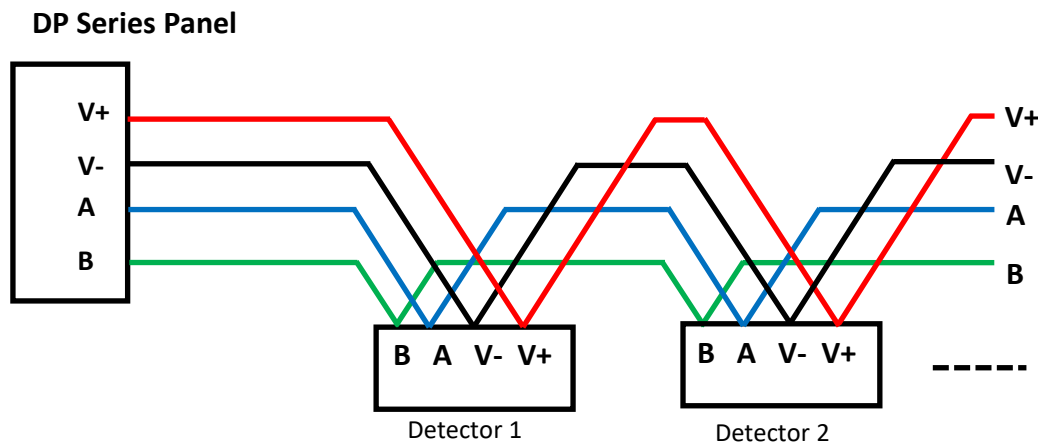


Diagram 15: Panel to detector connections

The connection must have bus structure (daisy-chain) as given in above diagram16. Star topology should not be used. Also devices cannot be used with mixed connection.

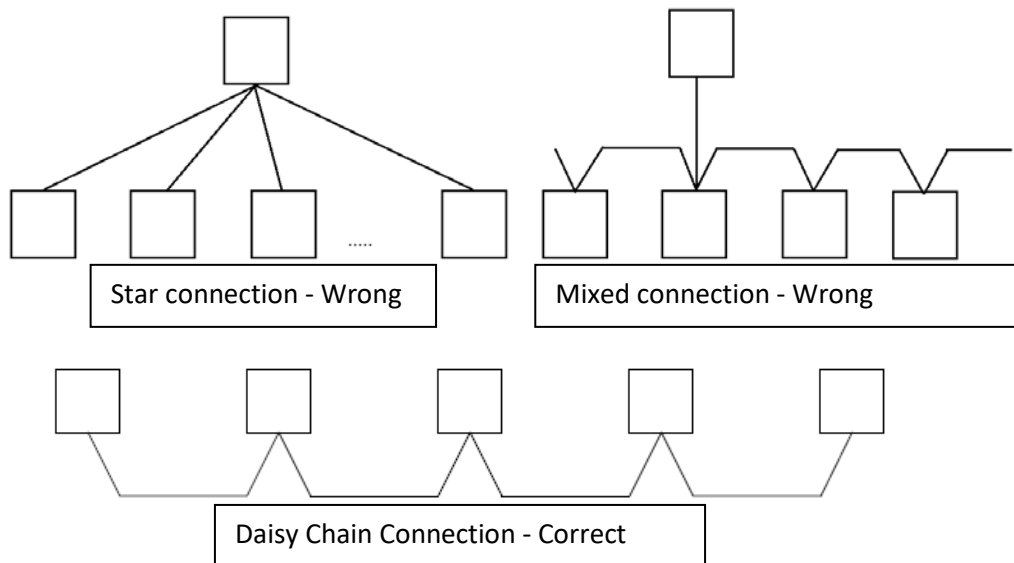


Diagram 16: MODBUS detector connections

Each detector connected to same DPX Series Gas Control Panel should have unique address. Detectors having same address would not be recognised by control panel. The **last** detector at the RS485 serial line should have the end of line resistor to enable the total communication line. Otherwise control panel may not communicate to all, some or none of the detectors.

5.5 Power Inputs:

DPX series Gas Control Panel has internal switching power supply. The connections between switching power supply and main board is already done in factory. The battery connections are already provided as ready to connect for user. The connection pins are marked on mainboard:

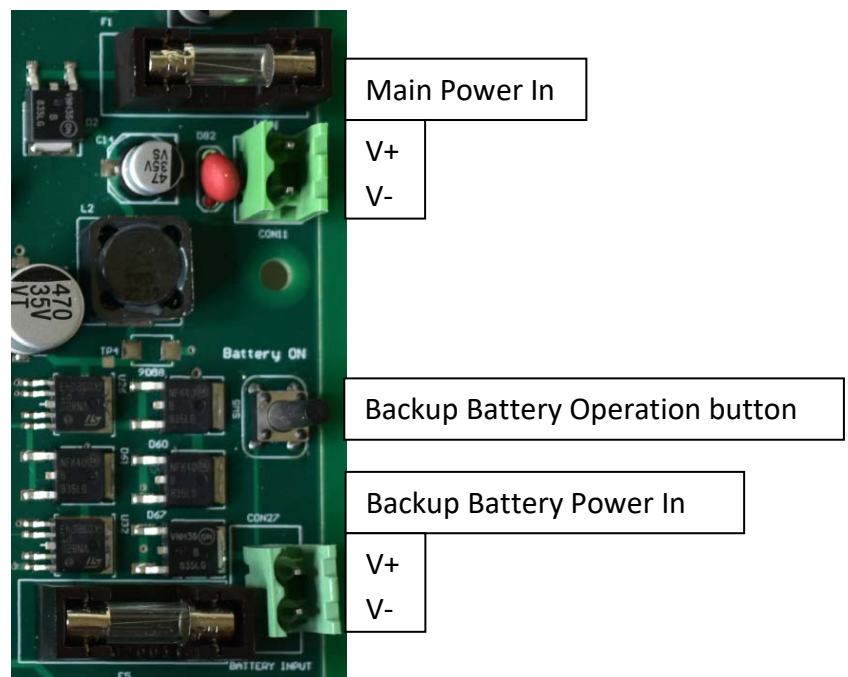


Diagram 17: Power Inputs

There is no need to remove the power and grounding connections from panel mainboard. But in case of any service action pins and connection locations must be controlled according to labels printed on mainboard.

5.5.1 Main Power Connection

The Panel has internal switching power supply to mains connection (220VAC). This connection must be made three-wire 1.5mm² cross section cable to the main supply terminal entries and fixed by using cable fastener on the terminal. Make sure all the detectors connected properly before applying the power. The power supply pin labels and their definitions are given in table10:

Name	Type	Usage
L	input	Phase
Gnd	input	Ground
N	input	Neutral
V+	output	+24VDC (Only for panel and detectors, do not use for any other device)
V-	output	-VDC

Table 10: Main power connection details

5.5.2 Backup Battery Connection

To continue operation in case of main power failure two backup batteries (12V 7Ah) must be serially connected to the system. Take extra care to connect the batteries with correct poles. The cables or main board can be damaged in case of mixing pins or making short circuits. Backup batteries must be connected as shown below.

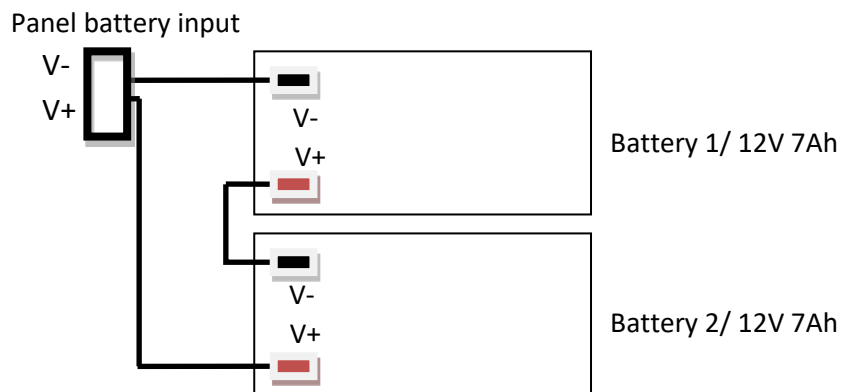


Diagram 18: Backup battery connection

Panel will automatically switch working with battery power in case of mains loss. If panel was off when mains power is not available user must press the battery operation button to start the panel via using backup battery power.

5.6 Fuses

DPX series Gas Control Panel has six fuses on main board to keep connected devices and panel safe. Their names and details are given below:

Fuse	Rating	Usage
F1	2A	Main power protection
F2	2A	VOUT A Protection
F3	2A	VOUT B Protection
F4	2a	Analog channel power protection
F5	2A	Battery protection
F6	2A	Siren (sounder) power protection

Table 11: Main board Fuse details

5.7 Analogue Input Module

Prosense provides analogue input module to connect detectors with analogue output to DPX Panel MODBUS Chain. The module has two input ports to connect analogue detectors and connects them to DPX Panel as MODBUS detector. Module converts 4-20mA measurement signal coming from detectors to MODBUS data and performs MODBUS communication with the panel. Any detector that has 4-20mA output can be part of MODBUS chain of DPX panel with DPX-Analogue module. Module needs power input to operate and must be connected to panel MODBUS chain like MODBUS detectors.

Analogue module default MODBUS address of the module is 1 and 2. The detector connected to channel-1 automatically assigned to MODBUS address 1 and detector connected to channel-2 automatically assigned to MODBUS address 2. Analogue module can be configured and assigned to different address via PDM software. In any case module will have two subsequent addresses based on the base address. For example if user assign MODBUS address 25 the detector on channel-1 will have MODBUS address 25 and channel-2 MODBUS address 26.

Analogue module has 3 relay outputs as listed below:

Port	Usage	Energy	Contact (NO / NC)
Fault	Fault Relay output	Energised	NO
AL1	Alarm 1 Relay output	Non-Energised	NO/NC
AL2	Alarm 2 Relay output	Non-energised	NO/NC

Table 12: Analogue Module relay configuration

Alarm relays have 3 pins grouped on board to adjust NO/NC option. The relay output pin positions shown below:

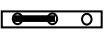
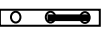
	Normally Open (NO)
	Normally Close (NC)

Table 13: Relay output NO/NC configuration

The analogue module must be setup using AN2 configuration tool to define target addresses for analogue detectors and adjust alarm levels for the relays.

Analogue module also provides Fault, Alarm1 and Alarm2 relay outputs for the connected detectors. The relays automatically activate depending on the detector alerts.

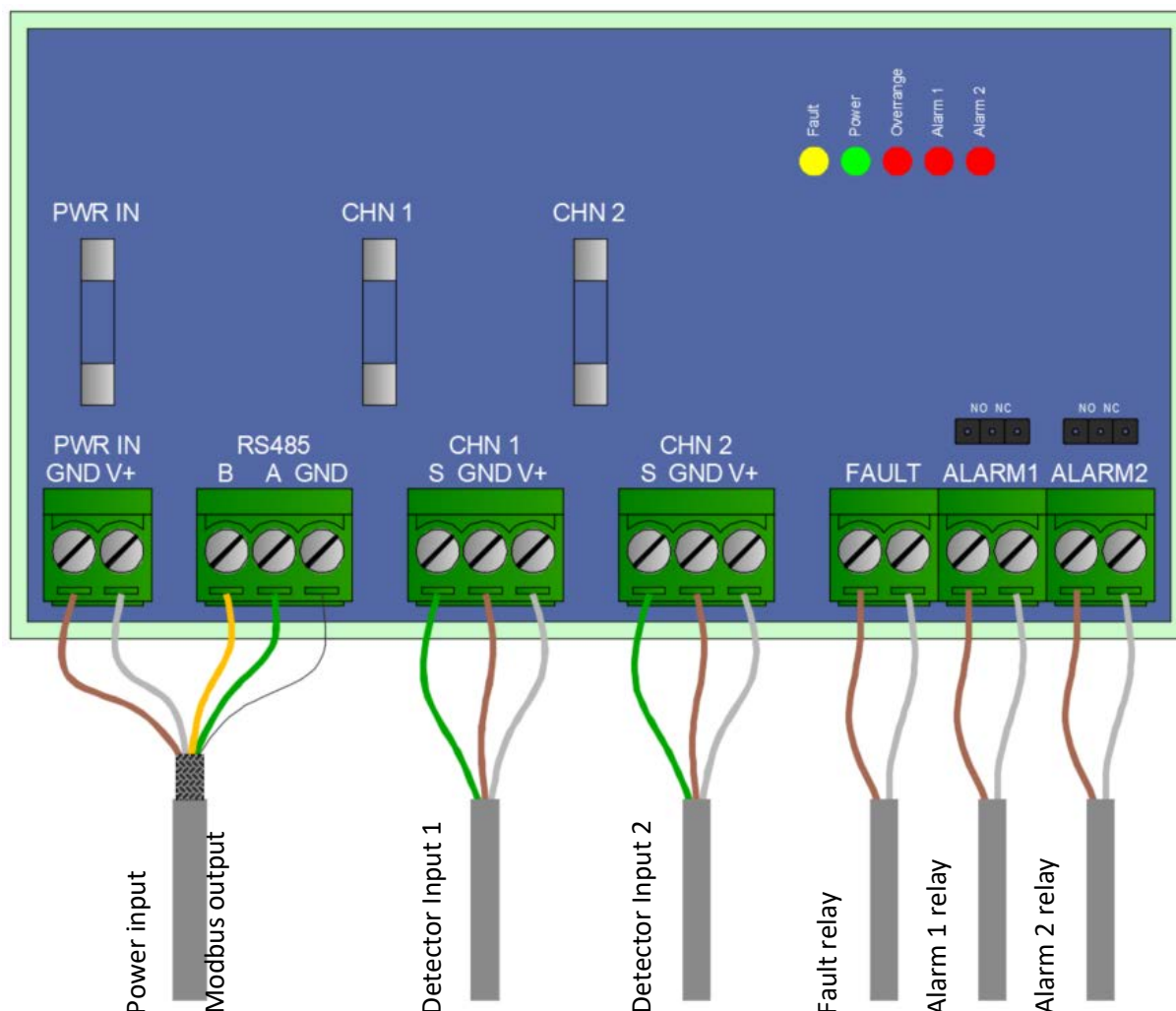


Diagram 18: Analogue Module connections

There are 3 fuses located on the electronic board. If replacement needed, plastic cover must be removed and fuse must be replaced with the new one.

Fuse	Rating
PWR IN	2000mA
CHN 1	500mA
CHN 2	500mA

Table 14: Analogue Module Fuse details

Connection ports and details are given in table:

Connector	Pins	Usage
PWR IN	V+	Power input 12-28VDC + connection
	GND	Power input 12-28VDC - connection
RS485	A	MODBUS Connection to DPX panel - port A
	B	MODBUS Connection to DPX panel - port B
	GND	MODBUS Connection to DPX panel - port Ground
CHN 1	S	Channel-1 Detector Connection 4-20mA signal input
	GND	Channel-1 Detector Connection Ground
	V+	Channel-1 Detector Connection +24VDC
CHN 2	S	Channel-2 Detector Connection 4-20mA signal input
	GND	Channel-2 Detector Connection Ground
	V+	Channel-2 Detector Connection +24VDC
FAULT	FAULT	Fault Relay output NC pin
	COM	Fault Relay output Common pin
ALARM1	ALARM-1	Alarm-1 Relay output NO/NC pin
	COM	Alarm-1 Relay output Common pin
ALARM2	ALARM-2	Alarm-2 Relay output NO/NC pin
	COM	Alarm-2 Relay output Common pin

Table 15: Analogue Module connection descriptions

Analogue input module have 5 LEDs that shows the status of the device.

LED	Color	Signal
Fault	Yellow	Off in normal operation, constant lit in fault
Power	Green/Red	Off when there is no power, blinks green or red in normal operation
Overrange	Red	Off in normal operation, constant lit in over range
Alarm 1	Red	Off in normal operation, constant lit in alarm 1
Alarm 2	Red	Off in normal operation, constant lit in alarm 2

Table 16: Analogue Module status LED descriptions

Analogue modules have no enclosure and must be mounted inside a panel or junction box depending on the needs of the installation.

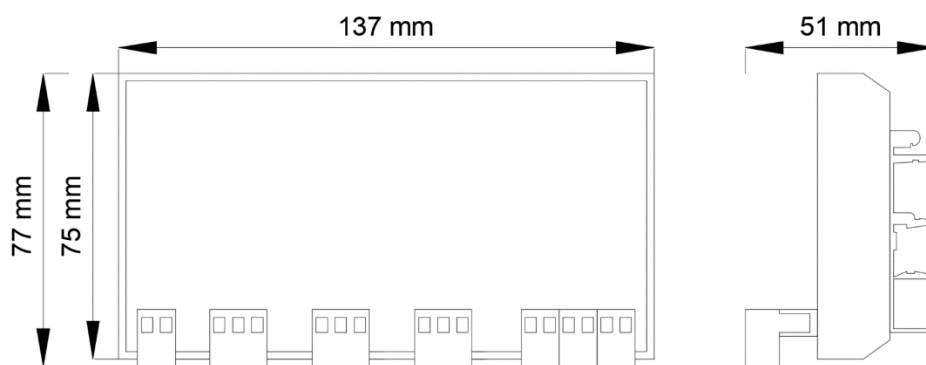


Diagram 19: Analogue Module dimensions

5.8 Relay Output Module

Prosense provides programmable relay output module to use for integration with 3rd party systems with relay outputs which could be connected to DPX Panel MODBUS Chain. The module has 4 programmable relays and an additional fault relay for monitoring module fault status. In total 8 modules(32 relays) can be connected per DPX panel. Relays can be programmed via DPX panel display or DPX Configurator software.

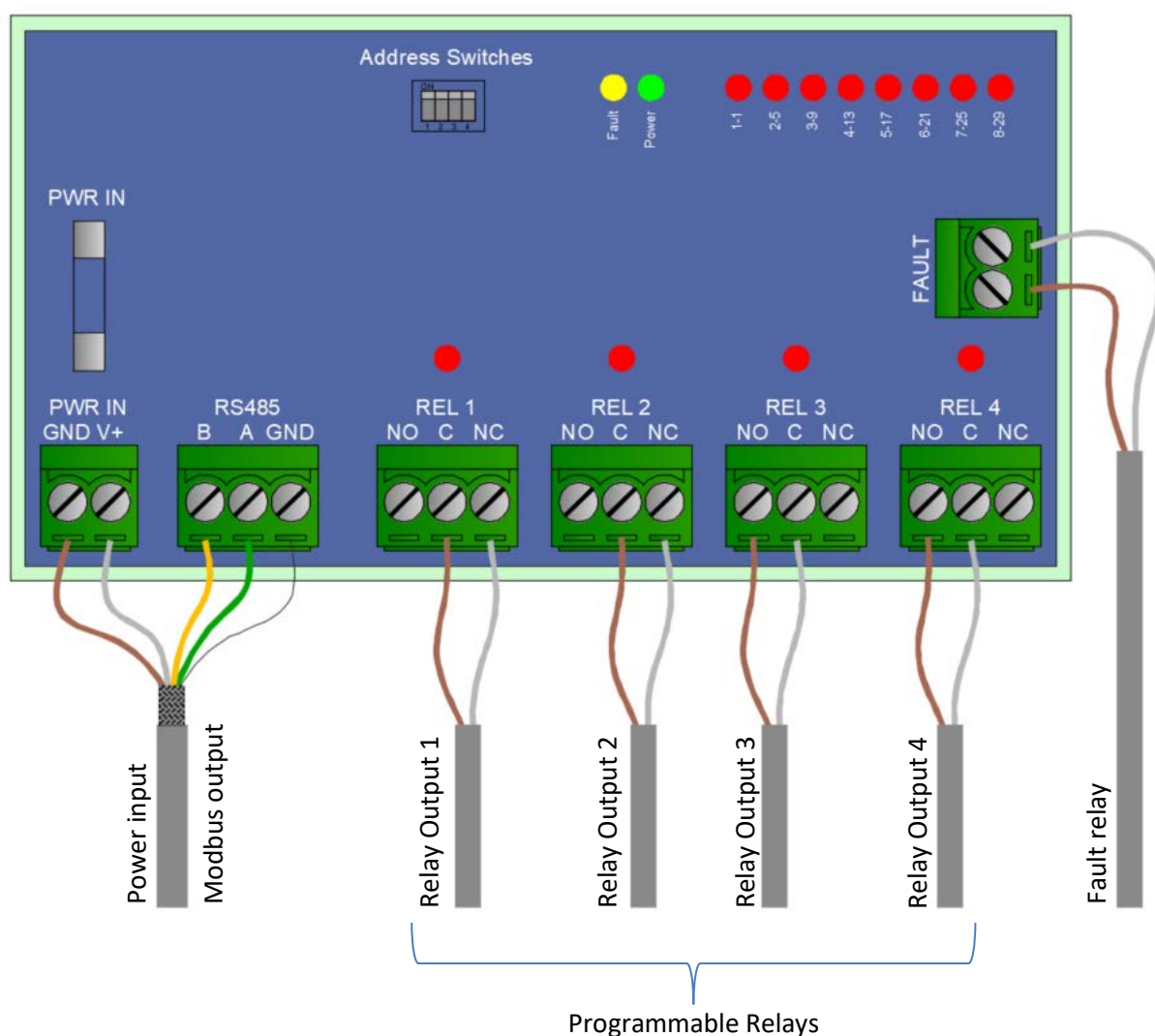


Diagram 20: Relay Module connections

There is a fuse located on the electronic board. If replacement needed, plastic cover must be removed and fuse must be replaced with the new one.

Fuse	Rating
PWR IN	2000mA

Table 17: Relay Module Fuse

Connector	Pins	Usage
PWR IN	V+	Power input 12-28Vdc + connection
	GND	Power input 12-28Vdc - connection
RS485	A	MODBUS Connection to DPX panel - port A
	B	MODBUS Connection to DPX panel - port B
	GND	MODBUS Connection to DPX panel - port Ground
REL 1	NO	Relay 1 output NO pin
	C	Relay 1 output COM pin
	NC	Relay 1 output NC pin
REL 2	NO	Relay 1 output NO pin
	C	Relay 1 output COM pin
	NC	Relay 1 output NC pin
REL 3	NO	Relay 1 output NO pin
	C	Relay 1 output COM pin
	NC	Relay 1 output NC pin
REL 4	NO	Relay 1 output NO pin
	C	Relay 1 output COM pin
	NC	Relay 1 output NC pin
FAULT	FAULT	Fault Relay output NC pin
	COM	Fault Relay output Common pin

Table 18: Relay Module connection descriptions

Module address can be configured via dip switches located on the electronic board. Device modbus address depends on dip switches and must be unique for every communication line.

Following table shows dip switch settings.

Module Address	Modbus Address	Switch Setting	Relay Addresses
1	137		1-4
2	138		5-8
3	139		9-12
4	140		13-16
5	141		17-20
6	142		21-24
7	143		25-28
8	144		29-32

Table 19: Relay Module switch settings

Each relay can be configured for fault, alarm 1, alarm 2, alarm 3 or over range event. Latch or auto-reset can be configured and each relay can have individual off delay from 0 to 99 minutes. This configuration can be done via DPX panel menu or DPX Configurator software.

Each RS485 detector and analogue channel can be configured for 3 events. This also could be configured via DPX panel menu or DPX Configurator software.

Relay modules have no enclosure and must be mounted inside a panel or junction box depending on the needs of the installation.

Relay output module have 14 LEDs that shows the status of the device.

LED	Color	Signal
Fault	Yellow	Off in normal operation, constant lit in fault
Power	Green/Red	Off when there is no power, blinks green or red in normal operation
Relay 1	Red	Off in normal operation, constant lit in activation
Relay 2	Red	Off in normal operation, constant lit in activation
Relay 3	Red	Off in normal operation, constant lit in activation
Relay 4	Red	Off in normal operation, constant lit in activation
Base Address 1	Red	Shows the base address(address of first relay) of module
Base Address 2	Red	Shows the base address(address of first relay) of module
Base Address 3	Red	Shows the base address(address of first relay) of module
Base Address 4	Red	Shows the base address(address of first relay) of module
Base Address 5	Red	Shows the base address(address of first relay) of module
Base Address 6	Red	Shows the base address(address of first relay) of module
Base Address 7	Red	Shows the base address(address of first relay) of module
Base Address 8	Red	Shows the base address(address of first relay) of module

Table 20: Relay Module status LED details

The dimensions of the relay module is given below:

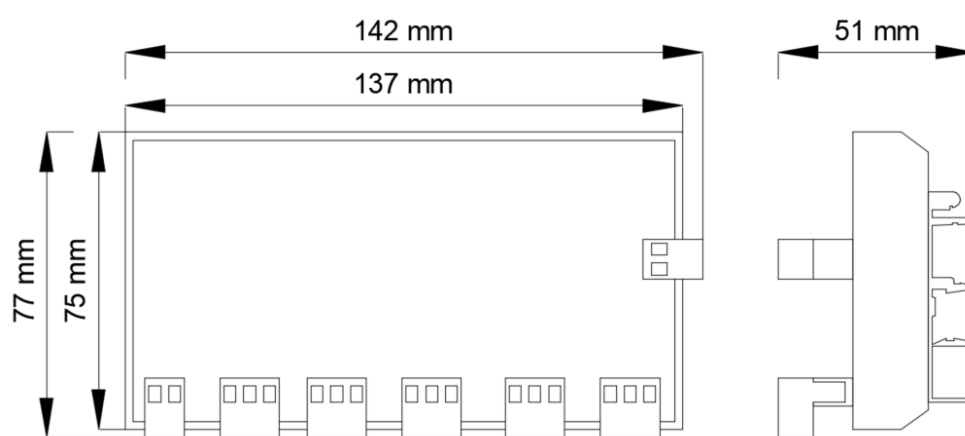


Diagram 21: Relay Module dimensions

6 Indicators

The front panel has the following indicators as shown in Diagram 4:

Status LED	Meaning
POWER	System Functioning
FAULT	Fault condition in at least one of the detector or panel component
SYS-FAULT	System malfunctioning
AL1	ALARM1
AL2	ALARM2
AL3	ALARM3
FAULT	Fault condition in at least one of the detector
SYS-FAULT	Fault LED for each detector (8 yellow LEDs)

Table 21: Front panel signs and meanings

There are four buttons nearby LCD screen to perform configuration and display the detector details. Their functions are given in table (The key assignments may vary depending on the menu page):

Key	Function For Configuration	Function For Display Operation
MENU	Enter to panel configuration menu	Disable Buzzer and siren
UP	Go to upper menu option during configuration	In normal operation, scroll through the list of detectors.
DOWN	Go to lower menu option during configuration	In normal operation, scroll through the list of detectors.
EXIT	Undo or exit from menu option	Change to screen and return to the previous in menu

Table 22: Panel buttons and functions



Diagram 22: Front panel signs LCD and LEDs

DPX Series Gas Control Panel has 40 LEDs numbered from Z1 to Z8 nearby LCD panel. Each zone has a LED indicator for fault, overrange, Alarm-1, Alarm-2, Alarm-3 status. These LEDs will be activated in case of fault, alarm or overrange to identify which detector zone is raising the status. These LEDs must be of in normal operation without any fault or alarm.

6.1 Display:

DPX Series Gas Control Panel has an OLED display to show overall panel status event summary and detector details. Panel Status screen provides a summary report about panel and related components:

Panel Status	
MCU	: OK
Power Main	: OK
Line Power	: OK
Battery	: OK
RTC Batt.	: OK
Siren	: OK
Detectors	: OK

Detector status can be seen as a summary report on detector information screen:

Z1CH01	0 %LEL
Z1CH02	0 %LEL
Z1CH03	0 PPM
Z1CH04	0 %VOL
Z2D001	0 %LEL
Z2D002	0 %LEL
Z2D003	0 %LEL
Z2D004	0 %LEL

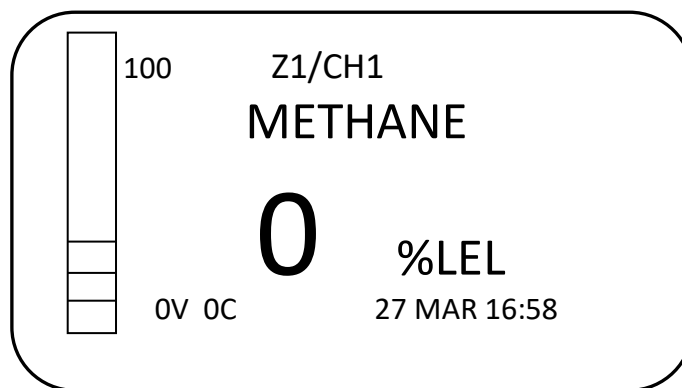
Panel screen will be updated with fault summary screen in case of any fault. The screen provides number of failures and their short summary:

Fault Cntr. : 2
Z3D002 FAULT XTMR COMM
Z4D008 FAULT XTMR COMM

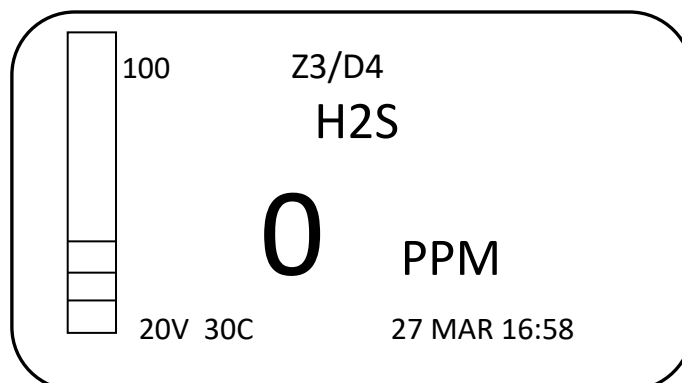
Panel screen will be updated with alarm summary screen in case of any alarm. The screen provides number of alarms and their short summary:

Alarm Cntr. : 2		
Z1CH01	LPG	AL3
Z2D004	METHANE	OVRNG

Panel also provides detailed view of each detector. The measurement level will be reported as alphanumeric value and also in a bar format. Detector will be reported as zone and channel information if detector is connected to analogue input channel. The example below shows Z1/CH1 meaning that detector is connected to analogue channel number 1 and assigned to Zone1.



If detector is connected to Modbus channel it will be reported with D prefix. Below example shows Z3/D4 meaning that detector having Modbus address 4 is assigned to Zone3.



6.2 Special States

Panel can recognize any special state in 2 minutes. Special States that can be recognized by the panel are:

- Warm up
- Fault
- Alarm (Alarm-1, Alarm-2, Alarm-3)
- Overrange

Below messages will be shown on display and visual indicators will be activated:

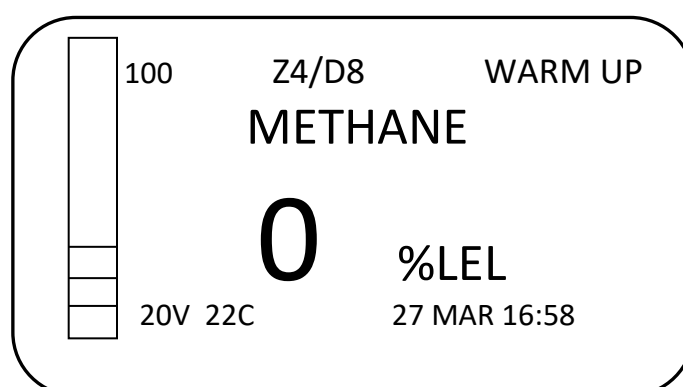
Status	Screen Output	LED Output	Relay Output
Warm-up	Warmup status will be reported for related Modbus channel	Fault LED will be lit on related zone	Fault Relay (RELAY 1) is de-energised
Fault	Fault status will be reported for related detectors	Fault LED will be lit on related zone	Fault Relay (RELAY 1) is de-energised
Alarm-1	Alarm status AL1 will be reported for related detectors	ALARM-1 LED will be lit on related zone	Alarm-1 Relay (RELAY 2) is energised
Alarm-2	Alarm status AL2 will be reported for related detectors	ALARM-2 LED will be lit on related zone	Alarm-2 Relay (RELAY 3) is energised
Alarm-3	Alarm status AL3 will be reported for related detectors	ALARM-3 LED will be lit on related zone	Alarm-3 Relay (RELAY 4) is energised
Overrange	Overrange status "OVERNG" message will be shown for related detectors	OVER RANGE LED will be lit on related zone	Overrange Relay (RELAY 5) is energised

Table 23: Status messages and related indicators

Panel will also generate audible alert via internal buzzer in case of any special state detected.

6.3 Warm-up Status:

The panel reports warm-up status for detectors when detectors are in warm-up status. The warm-up status is recognized when detector analogue signal level is 3mA for analog channel detectors and digital communication for the modbus connected detectors. The warm-up status signal level for analogue channels can be defined by user.



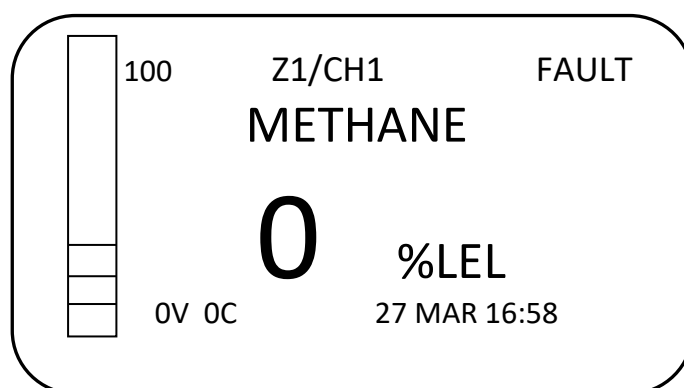
6.4 Fault Status:

The panel reports FAULT status in below cases:

- In case any of the detector connections lost
- In case any of the detector measurement level goes below minimum level
- In case any of the detector goes in to fault state
- In case any panel self-test routine reports a fault
- In case panel main power lost and while panel is working with battery power
- In case panel main power supply fails

Fault status has been detected by panel when an input signal is 2mA for detectors connected to 4-20mA analogue input channels. Detectors connected to MODBUS channels provide fault state via digital communication. Panel will activate FAULT relay and FAULT LED in case of any fault. Panel will also activate Fault LED for related zone if the fault status detected on a detector channel. The fault status signal level for analogue channels can be defined by user. Panel will activate SYS-FAULT LED if panel cannot manage its own state. The FAULT Relay will be activated at same time.

Fault relay is normally energised, and it will be de-energised when any of the internal fault detection measures detects a fault. The Fault LED will be activated also when line power is lost and system runs with battery power. It is also possible to get an alarm when control panel totally loses the power.



6.5 Overrange Status:

The panel reports overrange status in case any of the detectors reported measurement higher than defined measurement range. This status has been detected by panel when an input signal is over range ($> 20\text{mA}$) for analog input channels and modbus connected detectors provide measurement level or overrange status via digital communication. The overrange status signal level for analogue channels can be defined by user.

Overrange status is reported on display with "OVRNG" message and OVER RANGE LED on related zone will be lit. The overrange condition is highest measurement level that panel can understand and overrange level is higher than alarm levels. The alarm LEDs and relays will be activated before panel reports overrange condition.

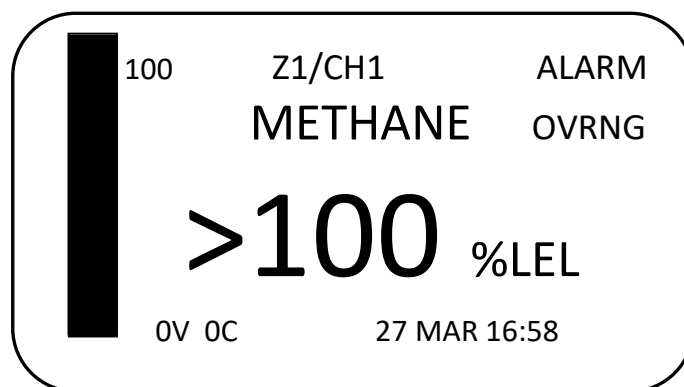
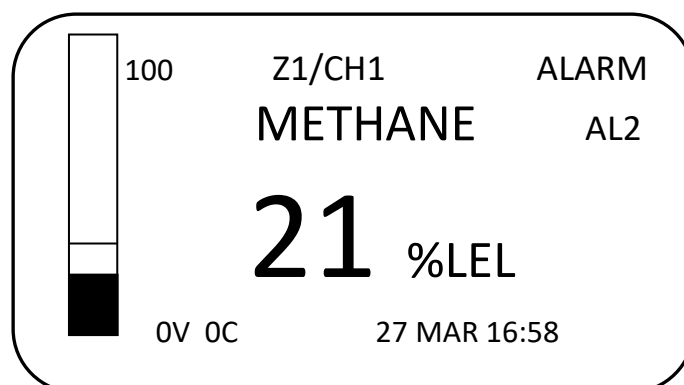


Diagram 10: Overage status display

Panel needs user intervention to clear Overage that can be reset via menu step "Reset". If the detector is connected through modbus channels, panel can send reset command to detector and clear the status if actual measurement level decreases. The analogue channel detectors needs reset to clear overrange status

6.6 Alarm Status:

The Panel will report Alarm status when gas level exceeds defined alarm levels on any of the connected detector. Panel has three adjustable measurement alarm levels. If any connected detector measurement reaches the given alarm threshold level, panel will activate related alarm relay and LED. Alarm-1 relay and LED will be activated in case any of the connected detector measurement reaches defined Alarm-1 threshold level. Panel will show "AL1" symbols for the related detector on display and also activate alarm LED on related zone. Alarm-2 relay and LED will be activated in case any of the connected detector measurement level reaches defined Alarm-2 threshold level. Panel will show "AL2" symbol for the related channel on display and also activate alarm LED on related channel. Alarm-3 relay and LED will be activated in case any of the connected detector measurement level reaches defined Alarm-3 threshold level. Panel will show "AL3" symbol for the related channel on display and also activate alarm LED on related channel. Lower alarm relays and LEDs will remain active while measurement level reaches the highest alarm level. But panel will report highest alarm status message on display



7 Programming

The panel needs configuration update according to site requirements and connected detectors. User should define connected detectors, define zones, adjust the alarm levels for each detector and adjust relay parameters. Each detector should be defined independently to related detectors measurement unit and scale as well as alarm levels. These adjustments can be done via using the keys nearby the screen. The menu content and step flow are given in Diagram 14.

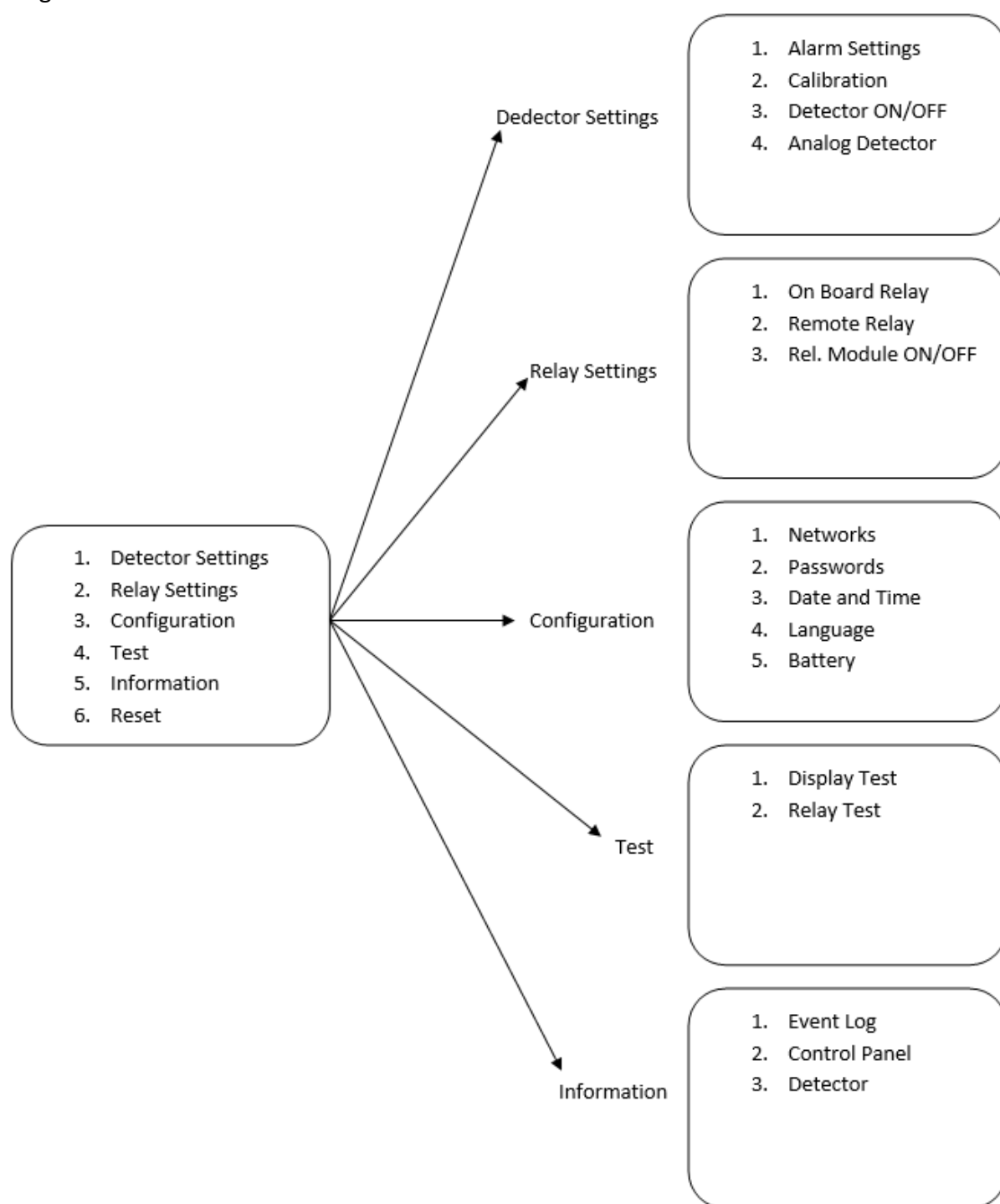
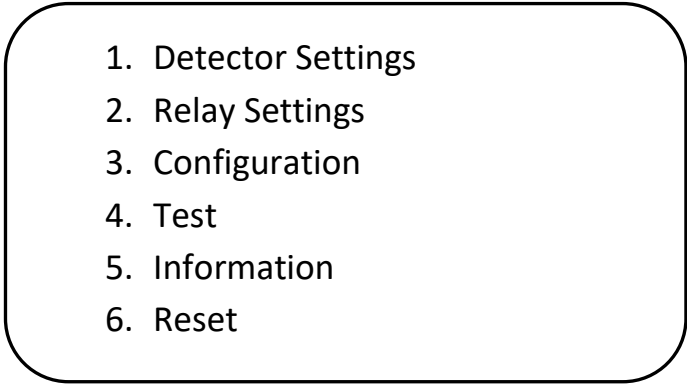


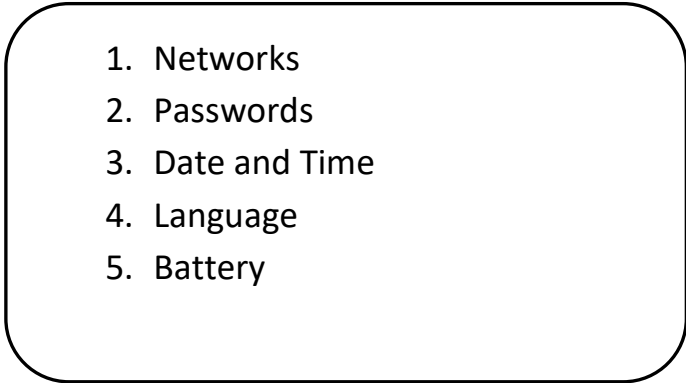
Diagram 23: Menu structure

7.1 Panel Configuration:

User can set panel parameters to manage it. Especially user passwords must be changed to secure the site environment. To adjust panel parameters select “3. Configuration” from main menu:

- 
- A rounded rectangular box containing a numbered list of six menu items.
1. Detector Settings
 2. Relay Settings
 3. Configuration
 4. Test
 5. Information
 6. Reset

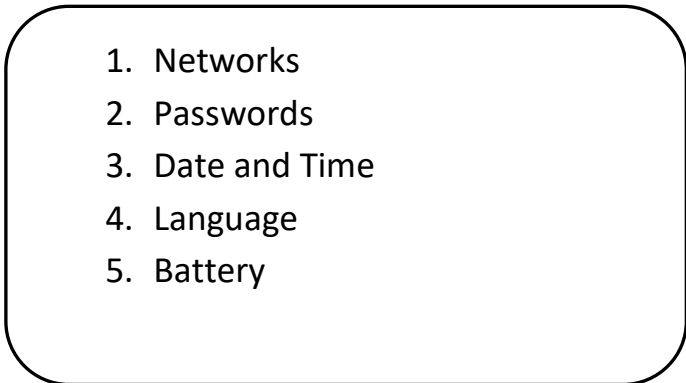
A sub-menu will be displayed:

- 
- A rounded rectangular box containing a numbered list of five sub-menu items.
1. Networks
 2. Passwords
 3. Date and Time
 4. Language
 5. Battery

User can adjust network parameters; L1 and L2 passwords, date and time of the panel, display language of panel and backup battery configuration via using menu options.

7.1.1 Setting Up Network Parameters:

DPX Series Gas Control Panel provides MODBUS and Ethernet connectivity. Panel can directly connected to a device that can understand MODBUS communication. RS485-3 port is programmed to provide MODBUS output from panel to a computer or a similar device. Panel also has RJ45 Ethernet interface to perform Ethernet communication. Select “1. Network” option from Configuration menu:

- 
- A rounded rectangular box containing a numbered list of five sub-menu items.
1. Networks
 2. Passwords
 3. Date and Time
 4. Language
 5. Battery

MODBUS and IP address details will be displayed with preconfigured values.

Modbus Adr.	: 1
Cloud Conn	: YES
Auto. IP	: YES
IP	: 192.168.1.2
Mask	: 255.255.255.0
GTWY	: 192.168.1.1

Panel program will guide user to set each digit one by one. To set current parameter and go to the next one use MENU button. Once all set and MENU button pressed all values will be recorded and panel will display “Successful” message to confirm values are recorded.

User can setup a specific IP address and netmask for the panel. It is possible to choose auto IP assignment by network management devices via DHCP. Auto IP parameter must be set to YES to enable automatic IP assignment via DHCP. Otherwise user should set this parameter to NO and configure IP, netmask and gateway addresses manually.

User should allow panel to connect to cloud. The cloud address is embedded in to network interface firmware and cannot be modified by enduser. User can only allow connection via setting Cloud Connection parameter to YES or disable connection via setting parameter to NO. If NO is selected the network interface will not try to reach outside works although it has IP address assigned internally.

7.1.2 Setting Up Date and Time:

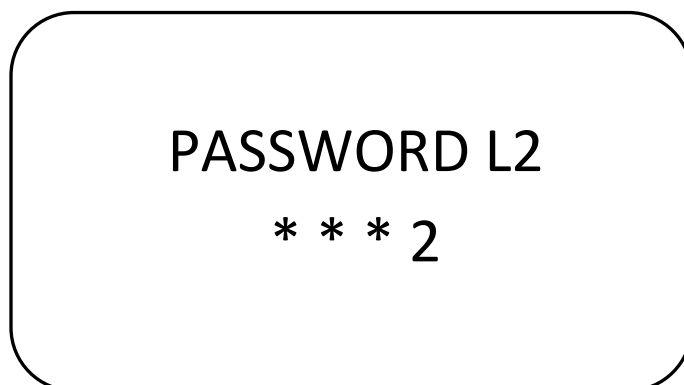
DPX Series Gas Control Panel keeps date and time information. It has an internal battery and even main power lost it can keep event logs safe. Select “3. Date and Time” option from Configuration menu to adjust date and time. Panel program will provide current date and time information:

Date and Time
YY/MM/DD HH/MM/SS
21/03/27 15/38/27

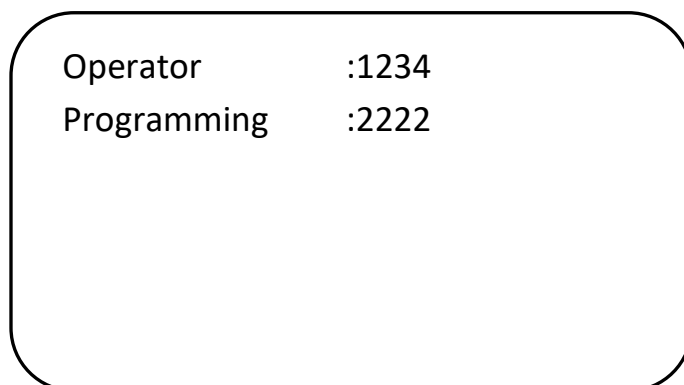
The first digit on screen will start blinking once entered the menu step. You can increase or decrease the value via using up and down keys. Once desired value has been set press MENU button to confirm and move to the next digit to set. Once all set press MENU button. The display will show “Successful” message and return back to Configuration menu.

7.1.3 Setting Up Passwords:

DPX Series Gas Control Panel provides two level security as L1 and L2. Level-1 (L1) security password is used to enable menu access. Level-2 (L2) security password is used to enable detector configuration menu. Select “2.Passwords” option from Configuration menu to set passwords. User must provide L2 password to reach password set screen:



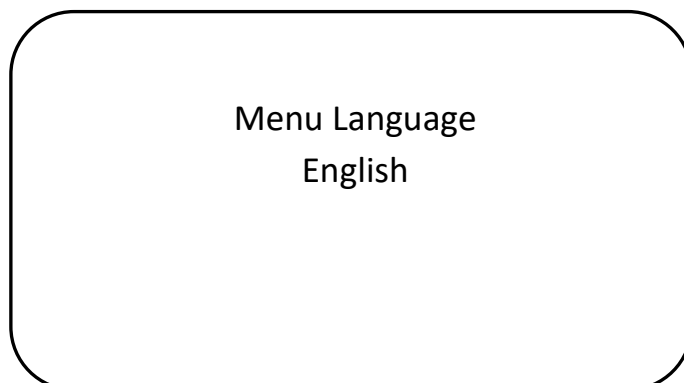
Password set screen will be displayed when correct password provided by user:



Operator password is level-1 (L1) password which can enable menu access. Programming password is level-2 (L2) password which can enable detector configuration menu options.

7.1.4 Setting Up Language:

DPX Series Gas Control Panel menu works in English, German and Turkish languages. To change menu language, select “4. Language” from Configuration menu. Panel program will display current language:



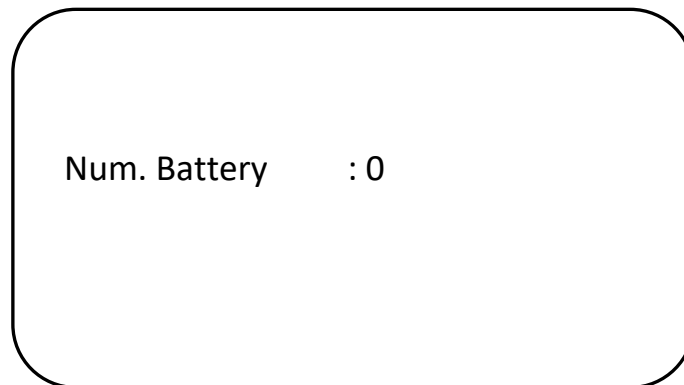
User can change language via using up and down keys:



When you select desired language press MENU button. Program will show confirmation message and work with selected language.

7.1.5 Setting Up Battery:

DPX Series Gas Control Panel can operate with batteries in case of power lost. To enable battery operation user should set batteries via using Configuration menu option "5. Battery. Panel program will ask number of batteries:



User should set either

0: operation without battery or

2: operation with battery

Panel will perform battery voltage check following user set number of batteries. If user set battery operation panel will continue operation in case power lost. If panel is started while main power lost, user must press the battery operation button to start battery.

7.2 Detector Settings:

DPX Series Gas Control Panel can manage both analogue and Modbus connected detectors. Their settings are done in different menu steps as their connection mechanism and management ways are different. User must have L2 security password to perform detector settings.

7.2.1 Analogue Detector Configuration:

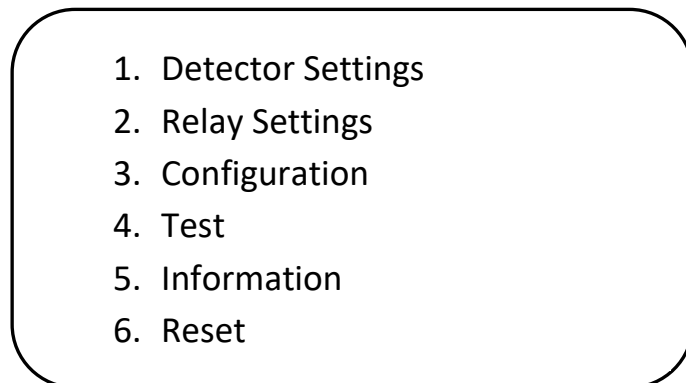
To perform analogue detector settings follow below steps.

1- Press Menu button. The screen will request password to display menu options:

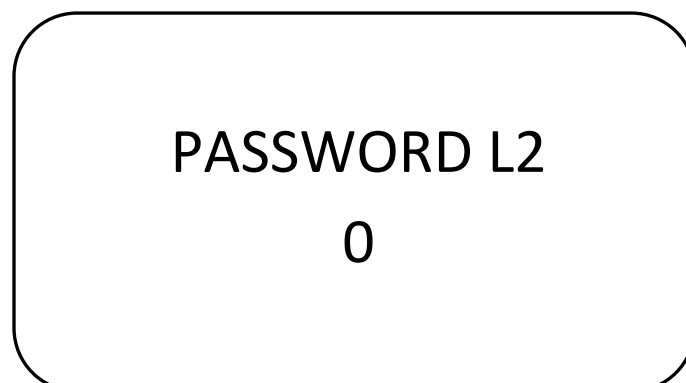


The default password is **1234**. It is strongly recommended to change the password after first login. To change password please see section "Changing Passwords"

2- Menu options will be listed:



Select "1. Detector Settings" and press MENU button. Panel software will request L2 password:



The default L2 password is **2222**. It is strongly recommended to change the password after first login. To change password please see section "Changing Passwords"

3- Once the L2 password provided panel will display detector settings options:

1. Alarm Settings
2. Calibration
3. Detector ON/OFF
4. Analog Detector

Select "4. Analog Detector" option.

4- Analogue detector setting options will be listed as follows:

1. Configuration
2. Alarm Settings
3. 4-20mA Settings
4. Event Relay

5- Select "1.Configuration" to define detector measured gas, measurement range and measurement unit :

1. Configuration
2. Alarm Settings
3. 4-20mA Settings
4. Event Relay

6- Panel program will display details for user to edit according to connected detector specifications:

Channel No : 4
Zone No : 1
Gas Type : 30 LPG
Unit : %LEL
Range : 100
MinMsr.Rng: 0

The parameters will be blinking on screen to let user set them one by one. The details of the parameters are given in table YY:

Parameter	Details	Values
Channel No	Analogue channel that detector connected	0-8
Zone No	The zone user want to assign the detector	0-8
Gas Type	Measured gas type of the detector	30-91
Unit	Measurement unit of the detector	%LEL, %VOL, PPM, PPB
Range	Measurement range of the detector	0-10000
Min.Msr.Rng	Minimum measurement of the detector	-1000 / +1000

Table 24: Analogue channel definition parameters

Channel No is pointing the analogue channel number that detector is connected. DPX Series Gas Control Panel can have either 4 or 8 analogue channels. DPX4 model have 4 channels while DPX8 has 8 analogue channels.

Zone No is a logical definition that user can group detector depending of the specific parameters such as location, gas type etc. DPX series panels can have up to 8 zones. If zone set to **0** , it disables the related detector.

Gas Type is the type of gas that detector can measure. Gas type defined with Prosense gas coding method. User will set the number and name for the gas will be updated automatically by panel. To see list of available gases please check appendix of this manual.

Unit is measurement unit of the detector that can be either %LEL, %VOL, PPM, PPB:

Range is measurement range of the detector. For gas detectors it can be defined as 0-100% LEL, 0-100%VOL, 0-10000PPM, 0-10000PPB. For other measurements which are Flame Detector (mA), Flow Meter (Pa), Level Meter (%), Pressure (bar), Humidity (%RH), Temperature (°C), it can be defined 0-10000.

Min.Msr.Rng is minimum range of the detector. For gas detectors it is 0. For other measurements which are Flame Detector (mA), Flow Meter (Pa), Level Meter (%), Pressure (bar), Humidity (%RH), Temperature (°C), it can be defined -1000 to +1000.

Once all set press MENU button and panel will record the given values and show a confirmation with “Successful” message.

7.2.2 Analogue Detector Alarm Settings:

Alarm levels for the analogue channel detectors must be defined at panel side. To set alarm levels select “2. Alarm Settings” from Analog Detector menu. Panel program will display a table to set each alarm:

Channel	: 1
Alarm	: 1
Level	:
Auto-reset	:
Direction	:
Hysteresis	:

The cursor on Channle number will be blinking. User must first set the number of channel that wanted to set the alarm and than select which alarm level wanted to set via using up and down buttons. When these parameters set and pressed the MENU button panle will display default alarm paramaters:

Channel : 1
Alarm : 1
Level :
Auto-reset :
Direction :
Hysteresis :

User should adjust each parameters to desired value and press the MENU to shift next paramater or digit.

Channel : 4
Alarm : 1
Level : 10%LEL
Auto-reset : YES
Direction : Rising
Hysteresis : 03

Once all set panel program will perform sanity check adn print "Successful" messages to confirm recording operation.

7.2.3 4-20mA Settings:

It is recommended to adjust 4-20mA settings to define fault, warm-up, overrange etc. signal levels for each channel. When you select "3. 4-20mA Settings" panel will display these options:

Channel : 1
Fault :
Warm Up :
Calibration :
Inhinbit :
Over Range :

User should adjust the channel desired to set. The channel number will be blinking. Use up and down buttons to set analogue channel number that detector connected. Then press MENU button. Panel will display default values for each state:

The default values and defined ranges for each state are given in table XX:

State	Default	Minimum	Maximum
Fault	2.0mA	1.0mA	3.5mA
Warm Up	3.0mA	1.0mA	3.5mA
Calibration	3.0mA	1.0mA	3.5mA
Inhibit	3.0mA	1.0mA	3.5mA
Over Range	22.0mA	20.0mA	22.0mA

Table 25: Analogue channel configuration parameters

Channel : 4
 Fault : 2.0 mA
 Warm Up : 3.0 mA
 Calibration : 3.0 mA
 Inhibit : 3.0 mA
 Over Range : 22.0 mA

7.2.4 Event Relay:

For every analogue channel, 3 remote event relays could be defined. To use this function relay modules must be installed on Line 1 or Line 2.

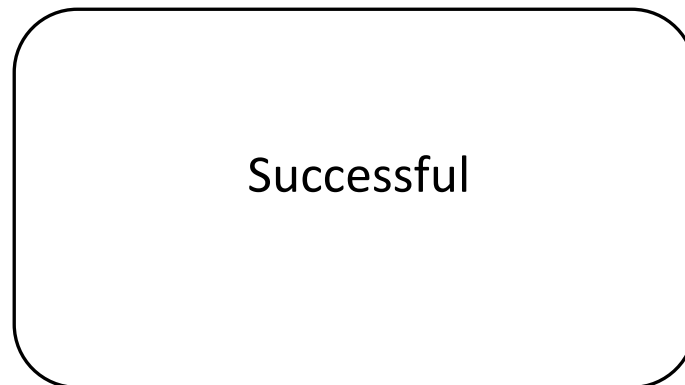
Channel : 1
 Event Rel.1 :
 Event Rel.2 :
 Event Rel.3 :

User should adjust the channel desired to set. The channel number will be blinking. Use up and down buttons to set analogue channel number that detector connected. Then press MENU button. Panel will display stored values for each event relay:

Channel : 1
 Event Rel.1 : 02
 Event Rel.2 : 18
 Event Rel.3 : 32

Use up and down buttons to set relay number and menu button to confirm.

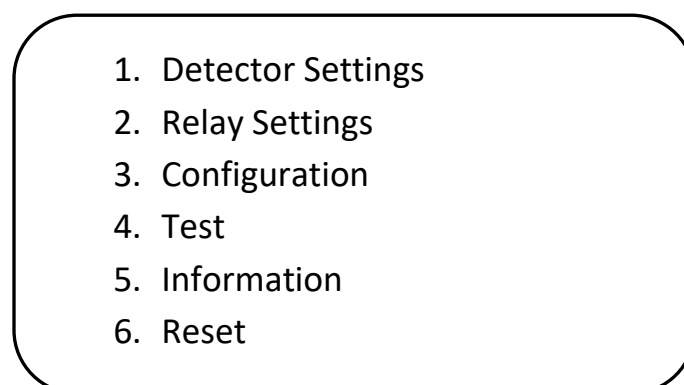
Menu will guide you to set each digit of the value for each state. Use up and down keys to change the value. Once set pres MENU button to set next digit or next state. Panel program will capture all settings in once when last digit set and perform a sanity check. If all adjusted in defined range then it will display “Successful” message. And if there is any problem it will display “Invalid Parameters” message.



These settings should be same on detector side for correct recognition of detector status at panel side. Any inconsistent settings might generate failure to recognize detector state correctly. Once signal levels are adjusted the detector can be configured. To configure go back to the previous menu via using back button.

7.2.5 MODBUS Detector Configuration:

DPX Series Gas Control Panel can read detector configuration details through MODBUS communication from Prosense Gas Detectors. To start communication between detector and panel detector must be set on through panel settings. User should set detector Modbus address on detector side and set detector ON panel side while detector is connected and working. To start select “Detector Settings” from main menu:



Then select “Detector ON/OFF” to setup a MODBUS detector

1. Alarm Settings
2. Calibration
3. Detector ON/OFF
4. Analog Detector

Panel program will display Line and Zone selection screen:

Detector : 001
Line No : 1
Zone No : 3
Event Rel.1 : 00
Event Rel.2 : 01
Event Rel.3 : 32

User should set the detector MODBUS address first. This address must be same with the address assigned to detector.

Line No is the connected MODBUS channel that detector already connected. DPX Series control panel has 2 MODBUS channels. They are marked as RS485-A which is Line No: 1 and RS485-B which is line No: 2. If Line No is set to zero 0 detector will be disabled even it is connected to panel.

Zone No is the logical segment that user want to assign this detector. If Zone No is set to zero (0) detector will be disabled even it is connected to panel.

For every detector, 3 remote event relays could be defined. To use this function relay modules must be installed on Line 1 or Line 2. Event relay numbers depends on relay module addresses and changes between 1-32. 0 means no event relay activation configured.

7.2.6 MODBUS Detector Alarm Settings:

DPX Series Gas Control Panel can able to read status and parameter information directly from a Prosense Gas detector. To adjust alarm parameters user should select “1.Alarm Settings” from “Detector Settings” menu

1. Alarm Settings
2. Calibration
3. Detector ON/OFF
4. Analog Detector

Panel program will display a generic window for user to set desired detector and alarm level to set:

Detector : 001
Alarm : 1
Level :
Auto-reset :
Relay :
Off Delay :

Once detector and alarm level set parameters will be updated with the current values on detector:

Detector : 001
Alarm : 1
Level : 010%LEL
Auto-reset : YES
Relay : De-energized
Off Delay : 00 Min

Panel program will guide user to set each parameter and digit one by one. Once all completed press MENU button, panel program will perform sanity check and display “Successful” message to confirm write operation. These parameters will be written directly onto detector. Once detector went in to alarm status panel can easily recognize it. Panel and detector alarm levels for MODBUS connected detectors will be same all the time.

7.2.7 MODBUS Detector Calibration:

DPX Series Gas Control Panel can initiate calibration operation for detector connected to MODBUS channels. This operation does not work for detectors connected to analogue channels. To start calibration, select “2. Calibration” option from “Detector Settings” menu. Panel program provide screen to set desired detector and calibration operation:

Detector : 001
Operation : Cancel

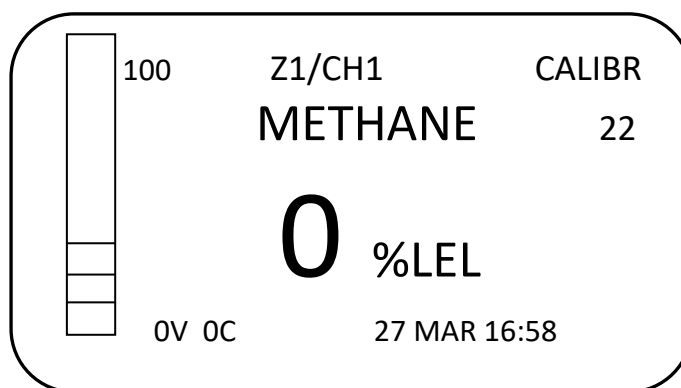
User should set the desired detector Modbus address then select the calibration operation. Select “Set Zero” for zero calibration:

Detector : 001
Operation : Set Zero

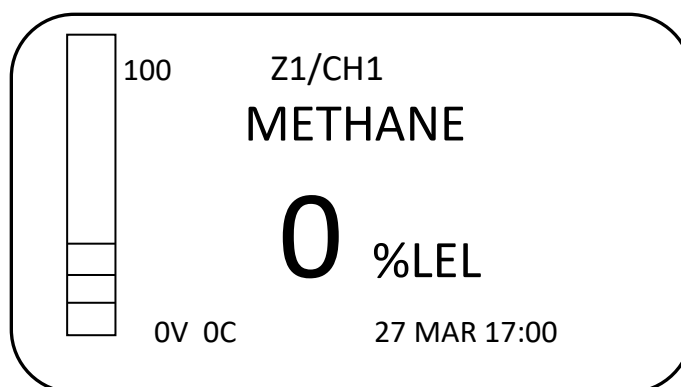
Select “Set Span” for span calibration:

Detector : 001
Operation : Set Span

Once calibration operation is started panel will switch to the single detector display mode:



The counter will be displayed at right top side of the display to monitor calibration progress. The display will be updated with current status of the detector once the calibration operation completed:



User should always follow the instructions given in detector user manual as all related details are detector specific. Panel is just providing interface for user to make life easier. Calibration can be failed or went completely wrong if user do not provide necessary gases during the calibration operation.

7.3 Relay Settings:

DPX Series has onboard relays to perform main functions without any optional module. User can add optional relay modules for special purposes to manage events in more specific ways. Relay settings can be adjusted via Relay Settings menu item on main menu. A detailed menu given below will appear once Relay Settings selected.

1. On Board Relay
2. Remote Relay
3. Rel. Module ON/OFF

7.3.1 On Board Relay Settings

DPX Series Control Panel has five relay outputs. Relay numbers and related events are defined as below:

Relay No	Event	Monitoring area	Assignment
Relay-1	FAULT	All Zones and Panel itself	No alteration
Relay-2	ALARM-1	All Zones	No alteration
Relay-3	ALARM-2	All Zones	No alteration
Relay-4	ALARM-3	All Zones	No alteration
Relay-5	OVERRANGE	All Zones	Can be altered

Table 26: Relay assignments

These predefined events related relays cannot be altered. Only Relay-5 can be changed and assigned to a different event. Also user can assign or remove zones from Relay-5. To change relay settings select “2.Relay Settings” from main menu:

1. Detector Settings
2. Relay Settings
3. Configuration
4. Test
5. Information
6. Reset

Relay parameters will be listed on display for user to select relay number to change. Program will also guide user to update each parameter:

Relay No	:2
Event Type	:ALRM1
D. State	: Energized
Off Delay	:00 Min
Zone from	: 1
Zone to	: 8

For relay number 2, 3 and 4 event type parameters cannot be changed as they are permanently assigned to alarms. Relay-5 is assigned to overrange status and it can be assigned to different event if needed.

Relays can be set to work in Energized or De-energized mode via adjusting “D. State” parameter.

Off Delay is a time period as minute. It keeps relays active after the related event cleared by given time period. If this feature is not necessary, delay should be set to zero (00).

“Zone from” and “Zone to” parameters are defining zones covered for the related events. These parameters are not changeable for the alarms. User can change zone coverage only for Relay-5.

Relay working mode such as latched or automatic is not defined per relay. This parameter is defined per detector and alarm level. Hence if user wants to set relay in auto-reset or latched, it should be defined via detector alarm settings.

7.3.2 Remote Relay Settings

Remote relay module includes 8 relays and can be connected through MODBUS connection to the DPX panel. Same MODBUS channels will be used to communicate to relay module same as detectors.

Remote Relay menu step must be used to adjust remote relay module parameters. Menu will display below options:

Relay No	:	01
Disable	:	NO
Event Type	:	ALRM1
Latch	:	NO
Off Delay	:	01 Min

The relay number must be selected first to adjust parameters. When relay number changed the settings will be done for the selected relay number.

Disable parameter is used for manual deactivation of relay. In some cases user might want to manually deactivate an automatically activated relay output. No means relay is active and automatic activation is enabled and YES means relay has been manually disabled.

Event Type parameter determines which event will be monitored by the relay. The events are same with the on-board relays such as Fault, Alarm-1 Alarm2, Alarm-3 and Overrange.

Latch parameter determines if relay works in latched or automatic mode. YES means latched and NO means automatic mode.

Off Delay is a time period in minutes. It keeps relays active after the related event cleared by given time period. If this feature is not necessary, delay should be set to zero (00).

Relay module base address and related relay addresses are defined by the switches located on the relay module. These settings are explained in table18.

7.3.3 Relay Module ON/OFF

An Optional relay module can be enabled or disabled via this menu step.

Module No :	1
Line :	1

Module No is pointing MODBUS address of the optional relay module.

Line is pointing which MODBUS channel relay module is connected. It is necessary to correctly set these parameters to enable Relay Module. If any of the parameters set to zero (0) the relay module will automatically be disabled as no communication is possible.

7.4 Test Options:

DPX Series Control Panel provides artificial testing option to user to control connections and event generation scenarios without using real gas. To run tests select “4.Test” option from main menu:

1. Detector Settings
2. Relay Settings
3. Configuration
4. Test
5. Information
6. Reset

Panel program will provide testing options:

1. Display Test
2. Relay
3. Relay Module

Display test flashes all pixels of the display and activates all LEDs to make sure all are in operation. Relay and relay module test is activating the relays that user can check whether switching outputs and connected devices working as expected. Panel program will provide relay selection screen when relay test option selected:

Relay :1
Set :

User should select the relay desired to test at first step. Then panel program will provide option to run on relay either energized or de-energized:

Relay :1
Set : De-energized

7.5 Information:

DPX Series Control Panel keeps event records. To see recorded events select “5. Information” option from main menu:

1. Detector Settings
2. Relay Settings
3. Configuration
4. Test
5. Information
6. Reset

Panel program will display event groups for user to select:

1. Event Log
2. Control Panel
3. Detector

Event logs will display fault and alarm events recorded by panel.

Log [001]
Z:3 D:6
10 MAR 16:43
ALARM AL3

Use UP and DOWN buttons to navigate recorded events by time.

“2. Control Panel” option provides detail about control panel details:

Model	: DP32
Serial No	: 06052021
FW Ver.	: 1.2.4
FW Date	: 21/05/01

“3. Detector” option provides latest recorded event for detectors connected to MODBUS channels. User should set first detector MODBUS address that desired to see event via using MENU and UP and DOWN keys:

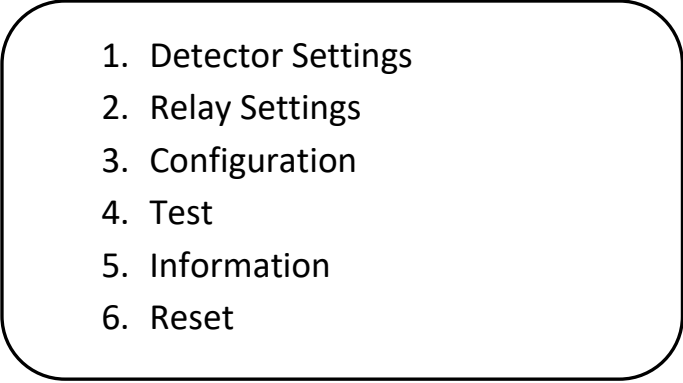
Address	: 001
Zone No	: 0
Line No	: 0
Gas	:---
Mode	:
Fault	: ---

Once address set panel will display the event:

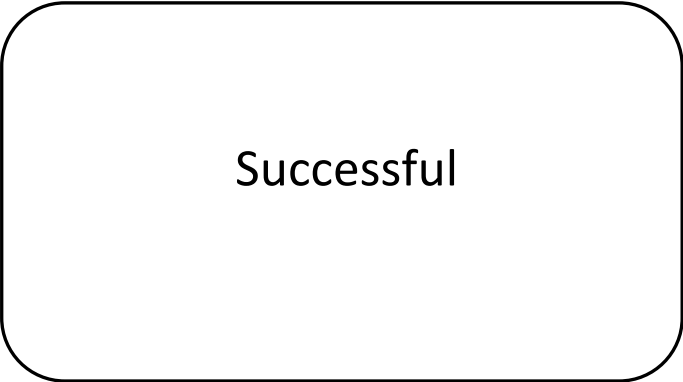
Address	: 005
Zone No	: 3
Line No	: 1
Gas	: H2S
Mode	: FAULT
Fault	: XTMR COMM

7.6 Resetting Alarms:

The DPX Series Gas Control Panel raises audible and visual alarms when detected an alarm condition. User can stop internal buzzer and external Siren via pressing the MENU button for 5 minutes. If the condition is same panel will again raise the alerts after 5 minutes. User can initiate reset status via using the panel. This is the last menu option and does not have any sub-menu. Enter the menu and select “6. Reset” option to execute reset operation:

- 
1. Detector Settings
 2. Relay Settings
 3. Configuration
 4. Test
 5. Information
 6. Reset

Panel program will re-scan all channels and detectors and update their current status. It will display “Successful” message on display and return back to main menu:



Successful

If detector status is changed and alarms were cleared panel will update internal status for them and will not raise alarm again. If the detector status is still same panel will raise alarms after minutes.

In case of overrange, panel status will not return back without executing the reset operation.

7.7 What to Do In Case Of Alarm

Refer to the mandatory safety procedures (gas alarm) set forth by your safety manager.

Recommendations:

Keep calm and follow these instructions:

1. Put out all naked flames (including cigarettes, pipes, etc.)
2. Turn off all gas appliances.
3. Turn off the gas supply at the tap and/or on the gas bottle (in the case of LPG).
4. Do not switch electrical appliances, lamps or the gas detection control unit on or off.
5. Open all windows and doors to air the room.
6. Do not “reset” the control unit if it is in the same room.

If the gas concentration reading on the control unit does not fall below the level of alarm, and the reason for the gas leak is not immediately apparent and/or cannot be repaired, quit the premises and call the gas supplier and/or emergency services immediately to check the installations and to make the premises safe and to possibly carry out the necessary repairs.

If the alarm stops and the reason for the alarm is identified and resolved (e.g. a kitchen burner lit off but in the open position) the gas supply may be re-opened after checking that all the gas appliances are off.

If all controls provided a clear status user can execute reset operation on panel and continue normal operation.

7.8 Failure Codes:

DPX Series Gas Control Panel provides overall status screen provides error codes when a failure is detected such as:

Panel Status	
MCU	: OK
Power Main	: FAULT 20
Line Power	: OK
Battery	: FAULT 41
RTC Batt.	: FAULT 52
Siren	: OK
Detectors	: FAULT 70

The error codes can guide user to understand reason for failure. Below table includes fault codes and their explanations.

Fault Codes	Fault Name	Details
10	CPU ERROR	CPU failure
11	MCU RAM ERROR	CPU internal memory error
12	STACK OVERFLOW ERR	Stack overflow error
13	FLASH CRC_ERR	Program CRC error
14	STNGS CRC_ERR	Parameters CRC error
15	SRAM FAILURE	SRAM fault
16	STNGS KEY ERR	Parameter keys CRC error
17	INVALID STNGS ERR	Invalid parameter value error
20	MAIN VOLTAGE ERROR	Main power failure (low or high)
30	VOLTAGE OUT ERROR	
31	CHNA VOLTAGE ERROR	MODBUS RS485-A channel voltage failure
32	CHNB VOLTAGE ERROR	MODBUS RS485-B channel voltage failure
33	CHNC VOLTAGE ERROR	Analogue channels voltage failure
40	BATTERY ERROR	Battery failure
41	BAT OPEN CIRCUIT	Battery open circuit failure
42	BAT SHORT CIRCUIT	Battery short circuit failure
50	RTC BAT ERROR	Clock battery failure
51	RTC BAT LOW	Clock battery voltage low
52	NO RTC BAT	No clock battery
60	SIREN ERROR	External Siren connection failure
61	SIREN OPEN CIRCUIT	External Siren connection open circuit
62	SIREN SHORT CIRCUIT	External Siren connection short circuit
70	DETECTOR FAULT	Detector fault

Table 27: Fault code definitions

Fault Code	Fault Name	Details
-1	NET_TIMEOUT	Timeout reached during a blocking operation
-2	NET_ERROR_WOULD_BLOCK	no data is available but call is non-blocking
-3	NET_ERROR_UNSUPPORTED	unsupported functionality
-4	NET_ERROR_PARAMETER	invalid parameter/configuration
-5	NET_ERROR_NO_CONNECTION	not connected to a network
-6	NET_ERROR_INVALID_SOCKET	socket invalid
-7	NET_ERROR_NO_ADDRESS	IP address is not known
-8	NET_ERROR_NO_MEMORY	memory resource not available
-9	NET_ERROR_NO_SSID	ssid not found
-10	NET_ERROR_DNS_FAILURE	DNS failed to complete successfully
-11	NET_ERROR_DHCP_FAILURE	DHCP failed to complete successfully
-12	NET_ERROR_AUTH_FAILURE	connection to access point failed
-13	NET_ERROR_DEVICE_ERROR	failure interfacing with the network processor
-14	NET_ERROR_IN_PROGRESS	operation (eg connect) in progress
-15	NET_ERROR_ALREADY	operation (eg connect) already in progress
-16	NET_ERROR_IS_CONNECTED	socket is already connected
-17	NET_ERROR_INTERFACE_FAILURE	an error in interface level
-18	NET_ERROR_DATA	an error in interface level
-19	NET_ERROR_SOCKET_FAILURE	an error in interface level
-20	NET_ERROR_OUT_OF_SOCKET	no more available socket , open failed
-21	NET_ERROR_CLOSE_SOCKET	error while closing socket
-22	NET_ERROR_DISCONNECTED	Connection dropped during the operation.
-23	NET_ERROR_CREATE_SECURE_SOCKET	failed to create the secure socket
-24	NET_ERROR_IS_NOT_SECURE	try to set secure option on a non secure socket
-25	NET_ERROR_FRAMEWORK	should never happen
-26	NET_ERROR_STATE_TRANSITION	should never happen
-27	NET_ERROR_INVALID_STATE_TRANSITION	should never happen
-28	NET_ERROR_GENERIC	generic error
-100	NET_ERROR_MBEDTLS_ENTROPY	mbedtls entropy setup failed
-101	NET_ERROR_MBEDTLS_CERT_PARSE	mbedtls parsing certificate failed
-102	NET_ERROR_MBEDTLS_KEY_PARSE	mbedtls parsing key failed
-103	NET_ERROR_MBEDTLS_SET_HOSTNAME	mbedtls cannot setup hostname
-104	NET_ERROR_MBEDTLS_SEED	mbedtls seed setup failed
-105	NET_ERROR_MBEDTLS_REMOTE_AUTH	mbedtls remote host could not be authenticated
-106	NET_ERROR_MBEDTLS_CONFIG	mbedtls error in config
-107	NET_ERROR_MBEDTLS_SSL_SETUP	mbedtls error setting setup
-108	NET_ERROR_MBEDTLS_CONNECT	mbedtls error while connecting
-109	NET_ERROR_MBEDTLS	mbedtls error while reading writing data

Table 28: Network fault code definitions

8 Declaration



Manufacturer Declaration of Conformity



Prosense Teknoloji San Ltd. Şti declares the DP Series products to be in accordance with the following standards and directives.

Name and address of Manufacturer: Prosense Teknoloji San Ltd Şti
Cumhuriyet Mah. Mermer Sok No:16
34876 - Kartal – İstanbul – Türkiye

Description of Devices: DPX Series Fixed Type Gas Control Panel
Designation: [Ex Gb] IIC

Applied Harmonized international standards:

EN/IEC 60079-0:2018 Equipment – General requirements

EN/IEC 60079-29-1:2016 Gas detectors – Performance requirements of detectors for flammable gases

EN/IEC 50270:2015 Electromagnetic compatibility - Electrical apparatus for the detection and measurement of combustible gases, toxic gases and oxygen

EN/IEC 50271:2018 Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen - Requirements and tests for apparatus using software and/or digital technologies

Applied European Directives:

2014/30/EU Electromagnetic Compatibility (EMC)

2014/35/EU Low Voltage (LVD)

Each DP Series gas control panel device which Production Quality Assurance procedures and Type Examination procedures have been applied has been shown to conform to an approved Type and to the applicable classification rules and essential principles before being supplied. This declaration is being made on the basis of the following certificates:

Quality Management Certificate:

18ISO0073

Production Quality Assurance Certificate:

ExVeritas 18PQAN0072

Type Examination Certificate:

IEP 20 ATEX 0883 X

Authorised Signatory:

Firat Celep
Production Manager

Date: 03.09.2021

DOC-CE.04 Rev No:4.1 Rev Tarihi: 03.09.2021

9 Appendix-A – Prosense Gas No Index

Gas No	Gas Name	Gas No	Gas Name
30	LPG	71	Carbondioxide
31	Methane	72	Freon Gas
32	Petrol vapour	73	JP8
33	n Butane	74	Formaldehyde
34	Propane	75	HCN
35	Hexane	76	Hydrogen peroxide
36	Hydrogen	77	Nonane
37	Pentane	78	Acetaldehyde
38	Toluene	79	Hydrogen Chloride
39	Methanol	80	TVOC
40	Heptane	81	VOC
41	Octane	82	Ozone
42	Ethanol	83	HF
43	Iso propanol	84	Phospine
44	Carbon monoxide	85	Isobutylene
45	Acetone	86	Silane
46	Methylethylketon	87	Diborane
47	Ethyl acetate	88	Arsine
48	Ammonia	89	Germane
49	Ethylene	90	Air Quality
50	Acetic acid	91	A2L Refrigerant Gas
51	Butyl acetate		
52	Cyclo hexane		
53	Cyclo pentane	24	Flame Detector (mA)
54	Dioxane	25	Flow Meter (Pa)
55	Ethane	26	Level Meter (%)
56	Butyl alcohol	27	Pressure (bar)
57	Styrene	28	Humidity (%RH)
58	Propylene	29	Temperature (°C)
59	Xylene		
60	Acetylene		
61	Benzene		
62	Ethylene oxide		
63	Vinylacetate(VAM)		
64	Hydrogen sulfide		
65	Oxygen		
66	Sulfur dioxide		
67	Nitric oxide		
68	Nitrogen dioxide		
69	Chlorine		
70	Hydrocarbon		

Table 29: Prosense Gas Number Index

10 Warranty statement

All products are designed and manufactured to the latest internationally recognized standards by Prosense under a Quality Management system that is ISO 9001 certified. As such Prosense warrants its products against defective parts and workmanship and will repair or (at its option) replace any instruments which are or may become defective under proper use within 12 months from date of shipment from Prosense Technology. The Product will be returned repaired or replaced if it is determined by Prosense that the part failed due to defective materials or workmanship. Warrant is only valid if product is shipped prepaid to Prosense at Kartal, Istanbul TURKEY, in a package equal to or in the original container accompanied by a detailed description of any issue. Prosense reserves the right to charge for any site attendance where any fault is not found with the equipment in case return of goods is not practicable. Prosense shall not be liable for any loss or damage whatsoever or howsoever occasioned which may be a direct or indirect result of the use or operation of the Contract Goods by the Buyer or any Party.

This warranty covers instrument and parts sold to the Buyer only by authorized distributors, dealers and representatives as appointed by Prosense Technology. The warranties set out in this clause are not pro rata, i.e. the initial warranty period is not extended by virtue of any works carried out there under.

10.1 Exclusions

If gas sensors are part of the Product, the gas sensor is covered by a twelve (12) month limited warranty of the manufacturer. The gas sensors are covered by this limited warranty is subject to inspection by Prosense for extended exposure to excessive gas concentrations if a claim by the user is made under this limited warranty. Should such inspection indicate that the gas sensor has been expended rather than failed prematurely, this limited warranty shall not apply to the Product.

This limited warranty does not cover consumable items, such as batteries, or items subject to wear or periodic replacement, including lamps, fuses, valves, vanes, sensor elements, cartridges, sinters or filter elements. This warranty does not cover damage caused by accident, abuse, abnormal operating conditions or poisoning of sensor.

10.2 Warranty Limitation and Exclusion

Prosense will have no further obligation under this limited warranty. All warranty obligations of Prosense are void in below cases:

- if the Product has been subject to abuse, misuse, negligence, or accident
- if the Distributor or User fails to perform any of the duties set forth in this limited warranty
- if the Product has not been operated in accordance with instructions
- if the Product serial number has been removed or altered

10.3 Limitation of Liability

In no event will Prosense Technology be liable for any incidental damages, consequential damages, special damages, punitive damages, statutory damages, indirect damages, loss of profits, loss of revenues, or loss of use, even if informed of the possibility of such damages.

It is understood and agreed that Prosense' liability, whether in contract, in tort, under any warranty, in negligence or otherwise shall not exceed the amount of the purchase price paid by the purchaser for the product. Under no circumstances shall Prosense be liable for special, indirect, or consequential damages. The price stated for the product is a consideration limiting Prosense' liability. No action, regardless of form, arising out of the transactions under this warranty may be brought by the purchaser more than one year after the cause of actions has occurred. To the extent permitted by applicable law, these limitations and exclusions will apply regardless of whether liability arises from breach of contract, warranty, tort (including but not limited to negligence), by operation of law, or otherwise.