



TQ32

AREA
ALARM PANEL

OPERATING MANUAL



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Table of Contents

PROPRIETARY	3
COPYRIGHT	3
WARNINGS, CAUTIONS AND NOTES	3
SAFETY WARNINGS	4
1.0 Introduction	5
1.1 Indication LED's and Push Buttons	6
2.0 Installation	7
2.1 Power Connection	9
2.1 Sensor Connections	9
2.3 Relay Connections	10
2.4 Ethernet and Comms Connections	11
3.1 Configuration Web Pages	14
3.2 Network Page	17
3.3 System Page	19
3.4 Statistics Page	20
3.5 Locations Page	21
3.6 Relays Page	22
3.7 RS485 Serial Comms Page	24
4.0 Operation	25
5.0 Modbus	26
6.0 Technical Specification	27

List of Figures

FIGURE 1 - FRONT PANEL	6
FIGURE 2 - INSTALLATION SCHEMATIC	7
FIGURE 3 - PANEL MOUNTING	8
FIGURE 4 - POWER CONNECTION	9
FIGURE 5 - SENSOR CONNECTION	9
FIGURE 6 - RELAY CONNECTION	10
FIGURE 7 - ETHERNET AND COMMS CONNECTIONS	11
FIGURE 8 - NETWORK CONNECTION DIALOG BOX	12
FIGURE 9 - NETWORK CONNECTION PROPERTIES DIALOG BOX	13
FIGURE 10 - INTERNET PROTOCOL DIALOG BOX	13
FIGURE 11 - LOGIN DIALOG BOX	14
FIGURE 12 - TQ32 AREA ALARM PANEL HOME PAGE	15
FIGURE 13 - CONFIG LOGIN DIALOG BOX	16
FIGURE 14 - TQ32 AREA ALARM PANEL SETUP PAGE	16
FIGURE 15 - NETWORK SETTINGS PAGE	17
FIGURE 16 - ADMIN PASSWORD PAGE	19
FIGURE 17 - CONFIG PASSWORD PAGE	19
FIGURE 18 - STATISTICS PAGE	20
FIGURE 19 - LOCATIONS PAGE	21
FIGURE 20 - CONFIG RELAYS PAGE	22
FIGURE 21 - RELAY LOCATIONS PAGE	23
FIGURE 22 - RS485 SERIAL COMMS PAGE	24

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WARNINGS, CAUTIONS AND NOTES



Warnings identify an operating or maintenance procedure, practice, condition, or statement that, if not strictly followed, could result in death or injury to personnel.



Cautions, which appear elsewhere in this manual, identify an operating or maintenance procedure, practice, condition, or statement that if not strictly followed could result in equipment damage or serious impairment of system operation.

Notes highlight certain operating or maintenance conditions or statements that are essential but not of known hazardous nature as indicated by Warnings and Cautions.

Warnings, Cautions and Notes are included throughout this manual, as required. Additionally, this section contains important Warnings that may not be contained elsewhere within this instruction manual.



SAFETY WARNINGS

- **FOR SAFETY REASONS, THE TQ32 AREA ALARM PANEL MUST BE INSTALLED, OPERATED AND SERVICED BY QUALIFIED PERSONNEL ONLY.**
- **READ AND UNDERSTAND THIS INSTRUCTION MANUAL COMPLETELY BEFORE OPERATING THE TQ32.**
- **THE OPERATION DESCRIBED IN THIS DOCUMENT IS THE INTENDED USE OF THE TQ32.**
- **TQ ENVIRONMENTAL LIMITED CANNOT BE HELD RESPONSIBLE IF THE TQ32 IS USED FOR ANY PURPOSE OTHER THAN THAT STATED. ANY OTHER USE OF THE TQ32 WILL INVALIDATE ANY CERTIFICATES ISSUED.**

1.0 Introduction

The TQ32 Area Alarm Panel enables the group monitoring of commonly used refrigerant gases such as R410A in areas with air conditioning systems etc. using the TQ31 Refrigerant sensor. It is designed to monitor a group of sensors in a specific area or floor and give an indication if any of its sensors have gone into alarm.

The TQ32 Area Alarm Panel will provide a local visual and audible alarm indication when any of its connected room sensors have entered the alarm state. It can also provide outputs for remote monitoring, reception or security stations for example as well as providing a plant trip signal.

There are 32 sensor inputs as standard, expandable to 64 inputs with the addition of an extra Sensor Input Board. In addition, the TQ32 Area Alarm Panel has 2 optional RS485 communication channels. One channel is for an optional external relay board output that can provide additional alarm relays if required. The other communication channel is for a MODBUS Output to provide the status of the Alarm Inputs.

1.1 Indication LED's and Push Buttons

The LED's on the TQ32 Area Alarm Panel are used to indicate the status of the Unit. There are three LED's and a 3 Digit 7-segment LED Display situated on the front of the Panel.

The **System Healthy** LED is a green LED and should normally be illuminated when power is applied to the TQ32 Area Alarm Panel. The **Refrigerant Alarm** LED is a red LED and should illuminate when an Alarm Input has entered an alarm condition. When the alarm condition has been removed the Alarm LED will extinguish. The **Multiple Alarm** LED is a red LED and should flash when more than one Alarm Input has entered an alarm condition. When the alarm condition has been removed the Multiple Alarm LED will extinguish.

The 3 Digit 7-segment LED Display is used to show the location (room number) of the alarms. This will alternate between rooms if more than one alarm is present. See configuration section for allocating room numbers

3 Push buttons are provided on the front panel. The **MUTE** button accepts any alarms and silences the audible alarm. The **NEXT** button allows the operator to view all rooms that may be in alarm. The **TEST** button performs a basic test of the Alarm panel, LED's and buzzer.

Note. Audible alarms from room sensors will only be silenced when any gas has cleared and the alarm condition has gone.

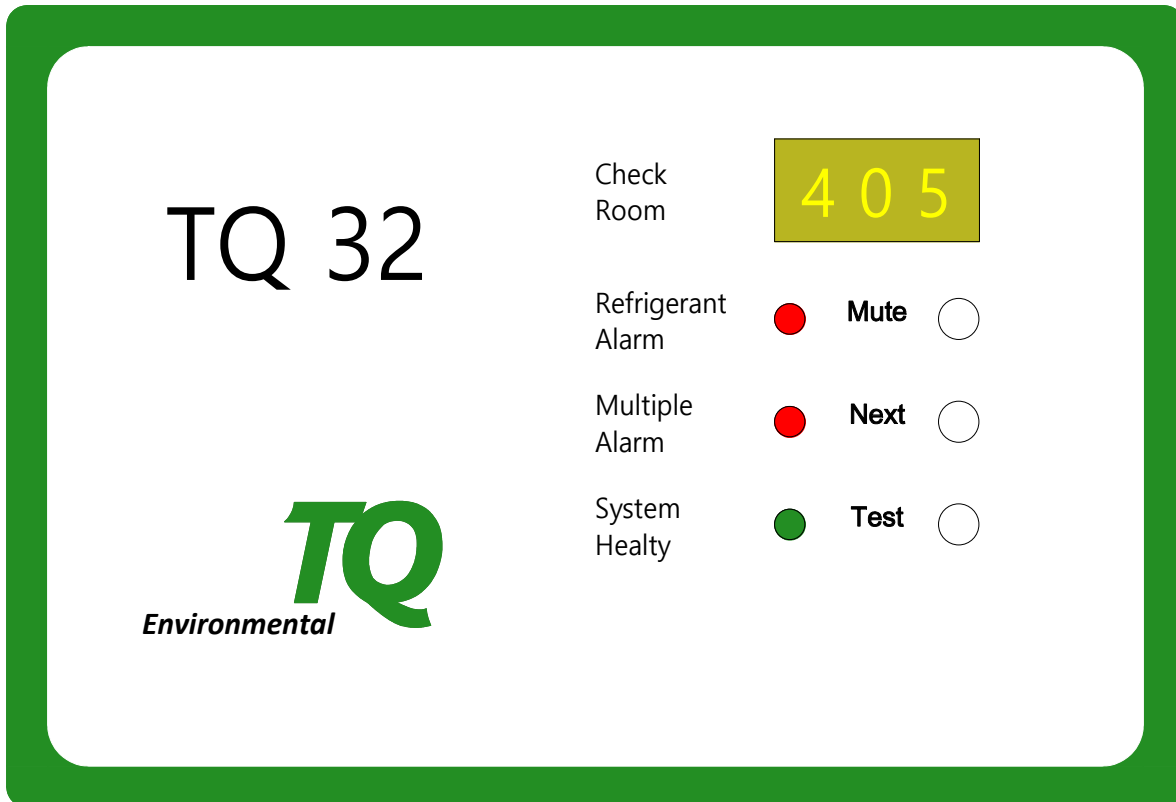


Figure 1 - Front Panel

2.0 Installation

A typical installation schematic is shown below

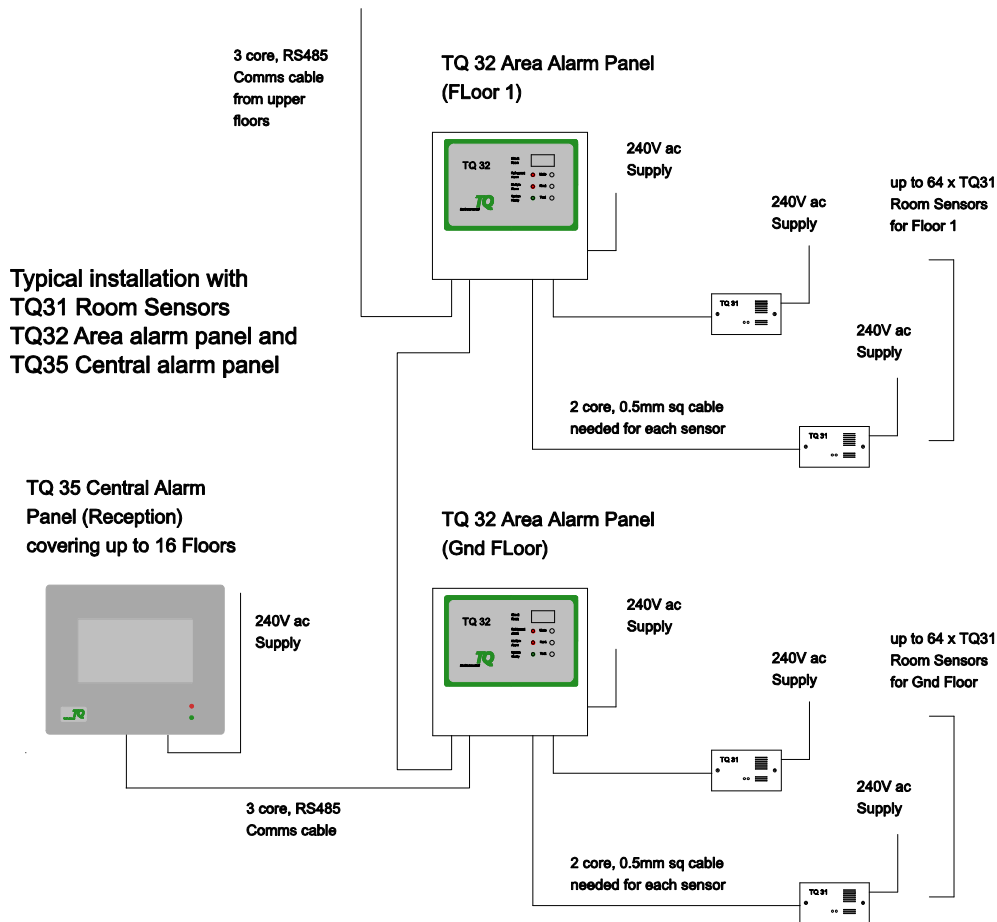


Figure 2 - Installation Schematic

Typical system Power Requirements.

TQ31 Room Sensors.

- Each TQ31 Room sensor to be connected to the mains supply via electrical back box. 240v ac 0.1A load
- Each TQ31 Room sensor to be connected to TQ32 Area Alarm Panel via 2 core, 0.5mm² cable. 24v DC, alarm indication only, 0.1A DC

TQ32 Area Alarm Panels.

- Each TQ32 Area Alarm panel to be connected to the mains supply via local fuse spur. 240v ac 0.5A load
- If required each TQ32 Area Alarm panel to be connected to TQ34 Reception Indicator Panel via 3 core, 0.5mm² cable (5 core if monitoring 2 floors). 24v DC indication only, 0.1A DC

TQ35 Central Alarm Panel.

- TQ35 Central Alarm Indicator Panel to be connected to the mains supply via local fuse spur. 240v ac 0.5A load

Each TQ32 Alarm panel needs to be securely wall mounted, ideally in a central location. The TQ32 alarm panel will need to be connected to the mains supply.

Each room being monitored will need a TQ31 Refrigerant Room sensor fitted. These can be mounted to 50mm deep, double back boxes and connected to the mains supply. See TQ31 manual for further instruction. A 2 core, 0.5 mm² cable to signal any alarm condition needs to be run back to the TQ32 Alarm panel from each room sensor.

If an optional Reception indicator panel is used to identify which floor or area is in alarm, then a 3 core 0.5 mm² cable needs to be run from the alarm panel relays to the reception panel.

Connection
to control pcb

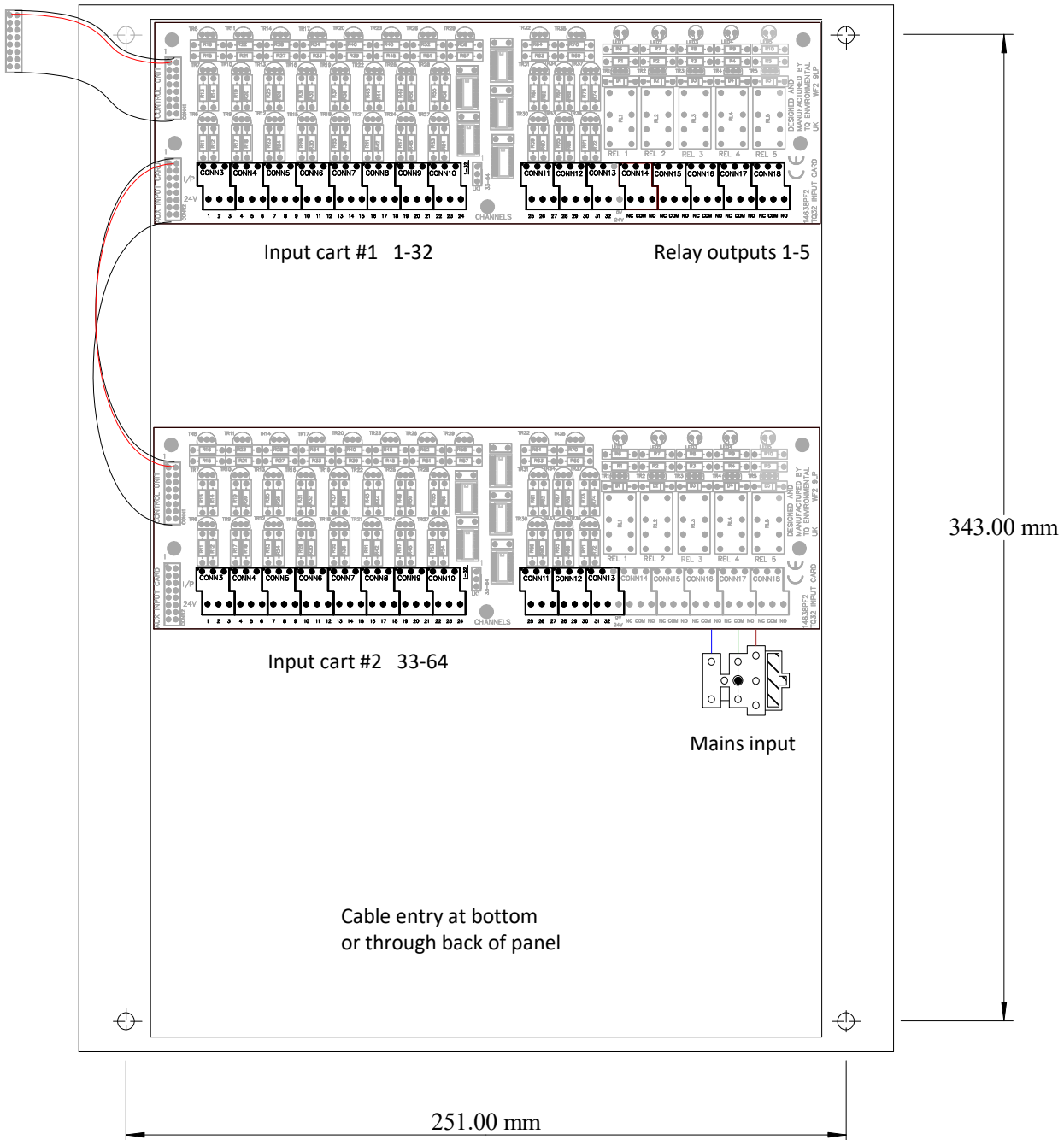


Figure 3 - Panel Mounting

2.1 Power Connection



Power for the TQ32 Area Alarm Panel is from a 100V-240V 50/60Hz AC supply. The green power LED will illuminate on the front panel.

The power connection is via a fused terminal located at the bottom right hand side, inside the alarm panel enclosure.

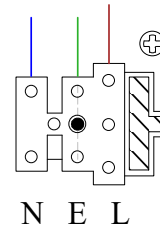


Figure 4 - Power Connection

2.1 Sensor Connections

Each room sensor needs to be connected to the TQ32 Alarm Panel with a 2 core cable as shown below. The input board terminals will accept wire sizes up to 0.5mm².

Sensor inputs are connected in vertical pairs left to right along the TQ32 input boards, as shown.

32 inputs on the top board with an additional 32 input available from the lower board if fitted.

Each sensor pair should be connected to the TQ31 room sensors Common (C) and Normally Open (NO) alarm contacts. See TQ31 manual for further identification.

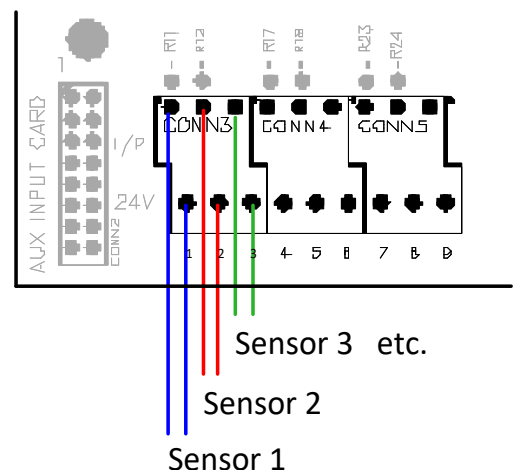


Figure 5 - Sensor Connection

2.3 Relay Connections

Five Common Alarm Relay contacts are available for remote indication on Connectors CONN14 to CONN18.

(Normally Closed) contact is on Pin 1, (Common) contact is on Pin 2, and (Normally Open) contact is on Pin 3.

The five relays can be typically used for:

- 1 x Fault
- 2 x Refrigerant Alarm - Plant Trip
- 2 x Refrigerant Alarm - Reception/Control Room

These contacts operate on the alarm state of the Alarm Panel's inputs (TQ31 room sensors) and are configurable via the internal web-server. These can be left as common relays (default) or each of the 4 alarm relays can be allocated a group of sensors to further split the alarms if required.

For each alarm relay RL1 (Fault) plus RL2, 3, 4 & 5.
 2 sets of output contacts are available.
 Each set of outputs has Common, Normally Open and Normally Closed volt free contact available as shown.

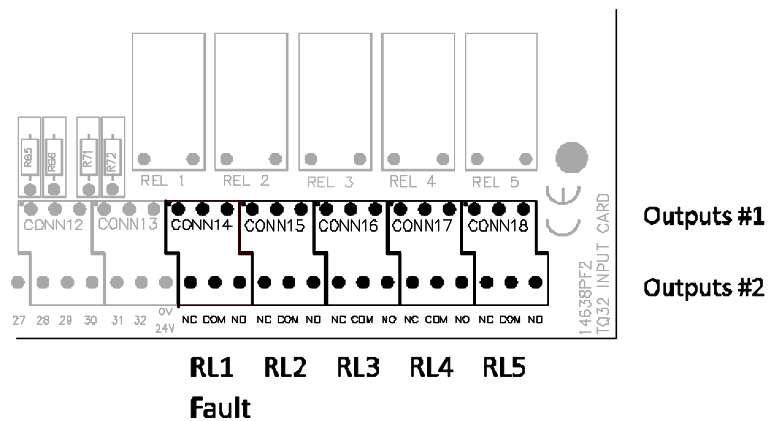


Figure 6 - Relay Connection

2.4 Ethernet and Comms Connections

The connections for Ethernet, RS485 MODBUS and TQ35 alarm panels can be found on the pcb mounted on the rear of the enclosure door. See below for a typical connection schematic.

Please see Section 3. Initial setup, for instruction to connect to the web page.

See section 5, RS485 Serial Comms, for MODBUS connections

See the TQ35 manual for further information on comms connections and cable types to be used for the alarm panel

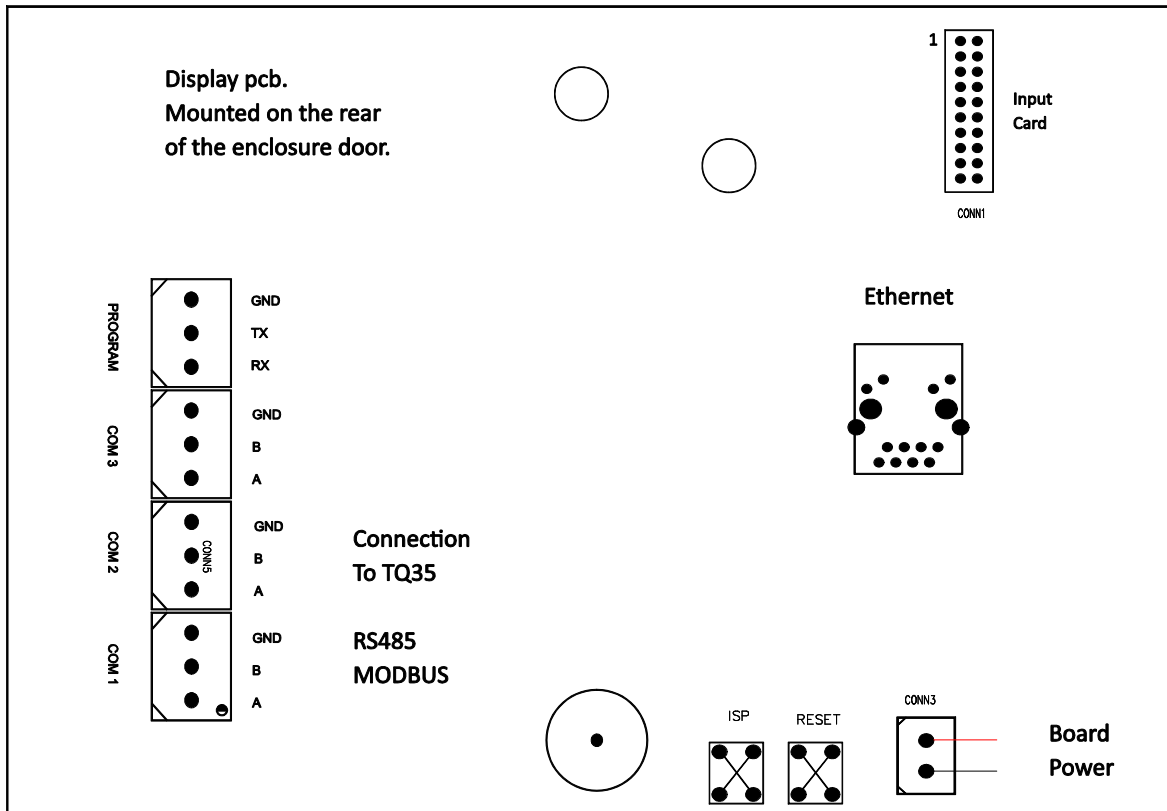


Figure 7 - Ethernet and Comms Connections

Note:

Communications Cable conforming to the RS485 Standard should be used for the installation of the TQ35 Central Alarm Panel or other RS485 MODBUS connection. Specifically; 3 cores (1 twisted pair plus 1 single) screened with a cable Characteristic Impedance, Z_0 , of 120Ω.

3.0 Initial Setup

The TQ32 Area Alarm Panel can be configured via a laptop connected to the Ethernet connection of the TQ32. This can either be a “crossover” Ethernet cable or via an Ethernet hub. The default TQ32 IP address is 192.168.34.150. To avoid conflict on the network, the laptop should have a different IP address to that of the TQ32 Area Alarm Panel.

On the laptop, the IP address can be setup from the Control Panel. To access the Control Panel, go to the Start menu and select Control Panel. When in the Control Panel select Classic View, and select the following:

Control Panel -> Network and Sharing Center

Then click on the network connection in use. This will bring up a window as shown in Figure 7 below.

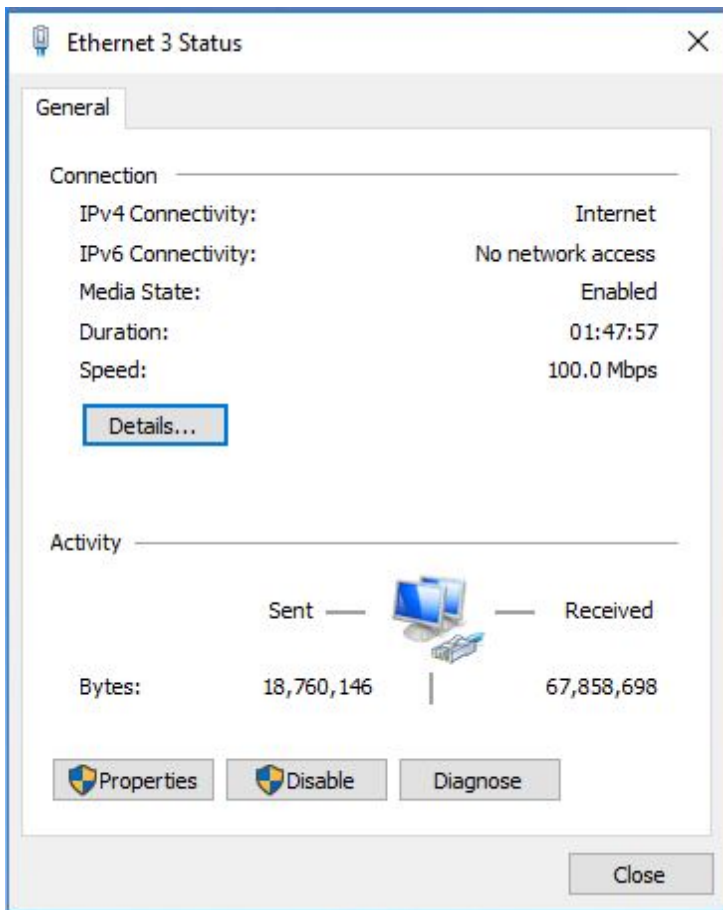


Figure 8 - Network Connection Dialog Box

Selecting the Properties tab will bring up the window as shown in Figure 9 below.

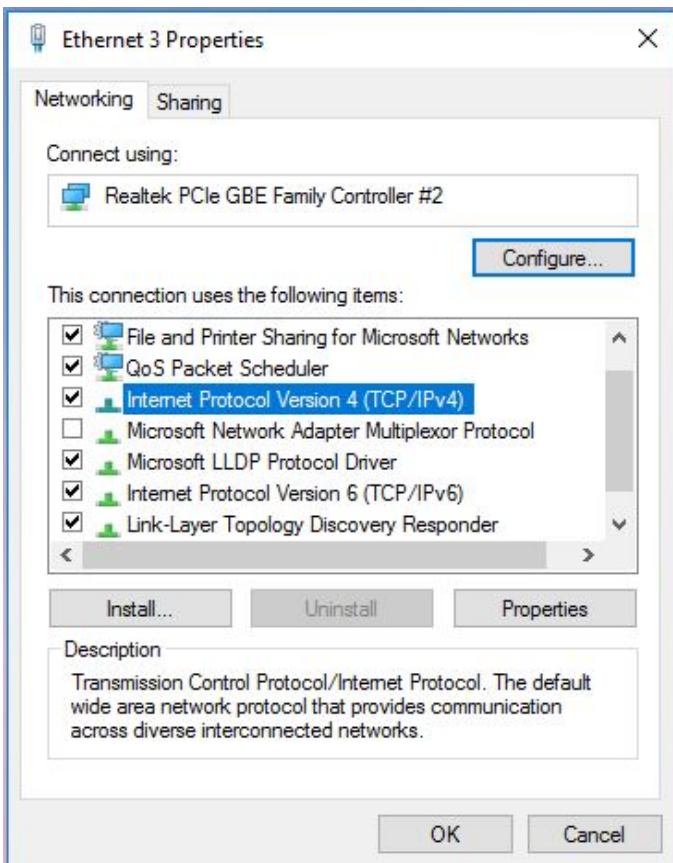


Figure 9 - Network Connection Properties Dialog Box

Click on the Internet Protocol Version 4 (TCP/IPv4) and then click Properties. The dialog box shown in Figure 10 will be displayed.

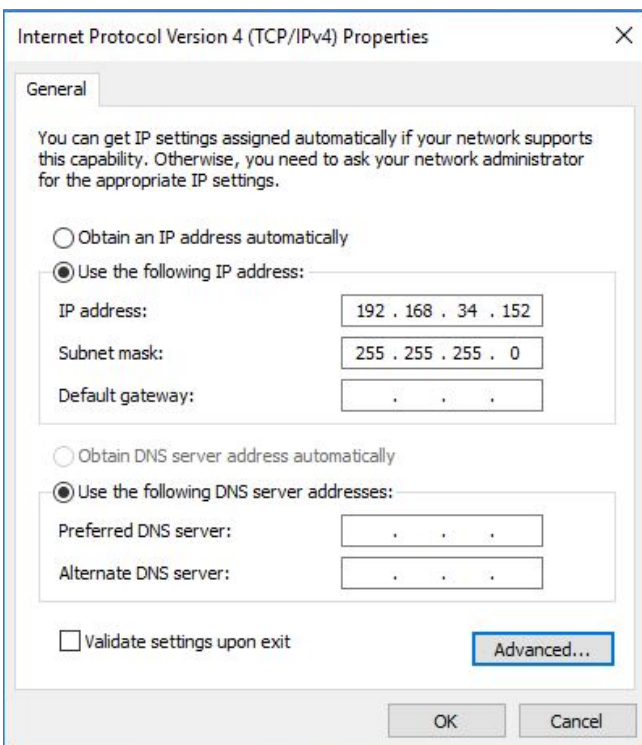


Figure 10 - Internet Protocol Dialog Box

When the screen is displayed, type the settings into the box as shown and click OK. The laptop will then be able to communicate with the TQ32 Area Alarm Panel Web Server and allow it to be configured.

3.1 Configuration Web Pages

The TQ32 Area Alarm Panel has an internal web-server that contains various web pages. These web pages may be used for configuring various aspects of the TQ32 Area Alarm Panel.

Configurable options include the following:

- Network Settings
- System Password
- Input Room Number/Location allocation
- Normally Energised or de-energised common relays
- Input grouping allocation of common relays
- RS485 Serial Communications Interfaces

To view these web pages, a web browser such as Mozilla Firefox, Chrome or Internet Explorer is required. The TQ32 Area Alarm Panel is supplied with a factory set IP address of 192.168.34.150. To view the default web page in the TQ32 Area Alarm Panel, start the web browser and type **192.168.34.150** into the address line of the browser window. A username and password dialog box will appear as shown in Figure 11 below:

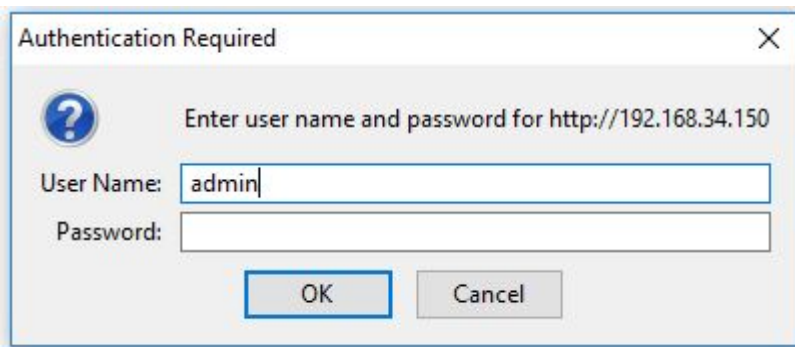


Figure 11 - Login Dialog Box

The default username is **admin** and the default password is left blank. The Home Page of the TQ32 Area Alarm Panel will now be displayed in the browser window as shown in Figure 12.

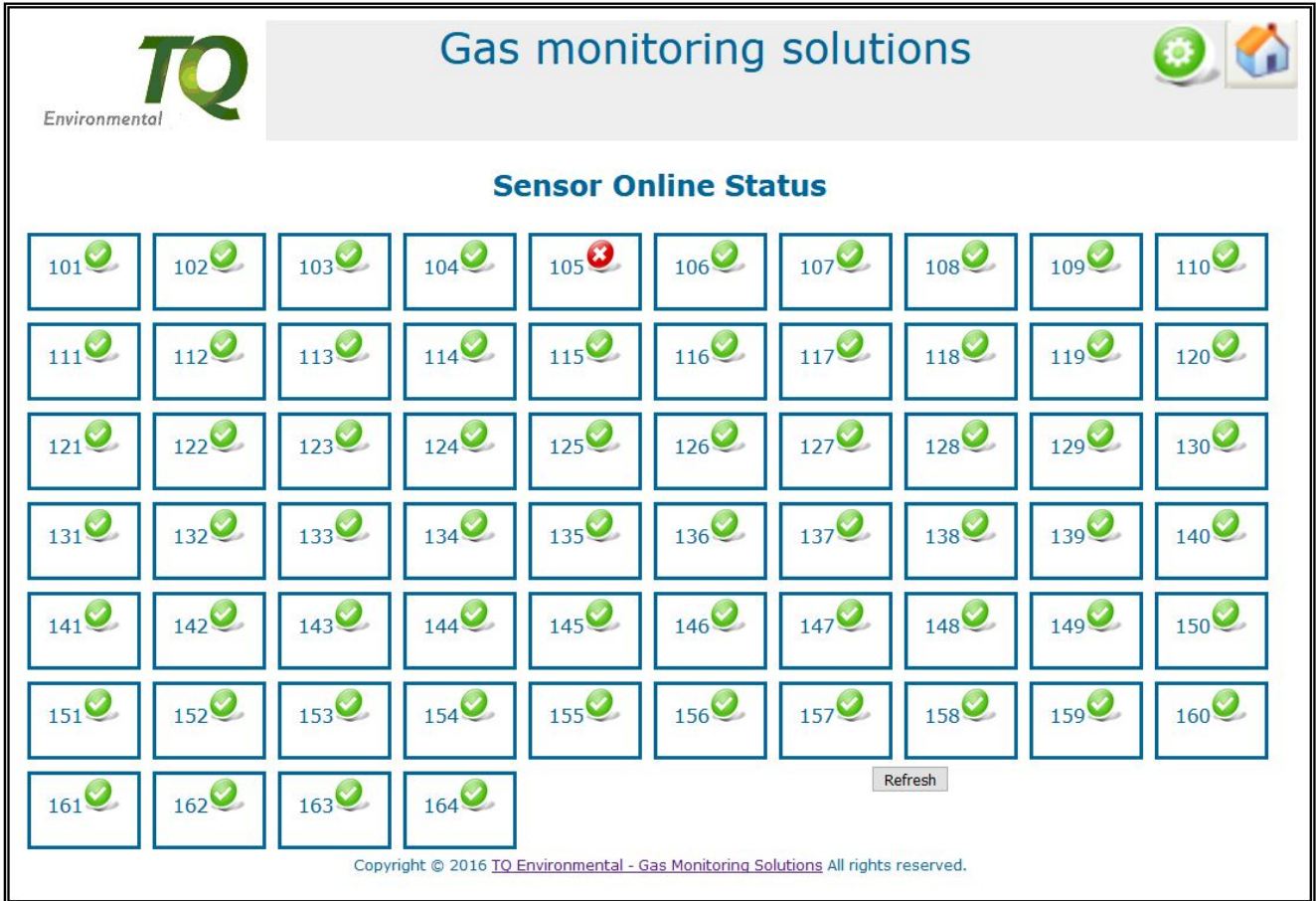


Figure 12 - TQ32 Area Alarm Panel Home Page

If no web page is displayed, go back to testing the network connection to the TQ32 Area Alarm Panel by using the **ping** command in the Command Prompt desktop app.

The sensor alarm status is automatically refreshed every five seconds; however, the user may manually refresh this page by clicking on the Refresh button. Figure 12 shown above indicates that the sensor in Room 105 is in alarm.

To enter the Configuration pages the user may click on the Gear icon at the top right of the screen. This will prompt the user to enter the config password as shown in Figure 13.

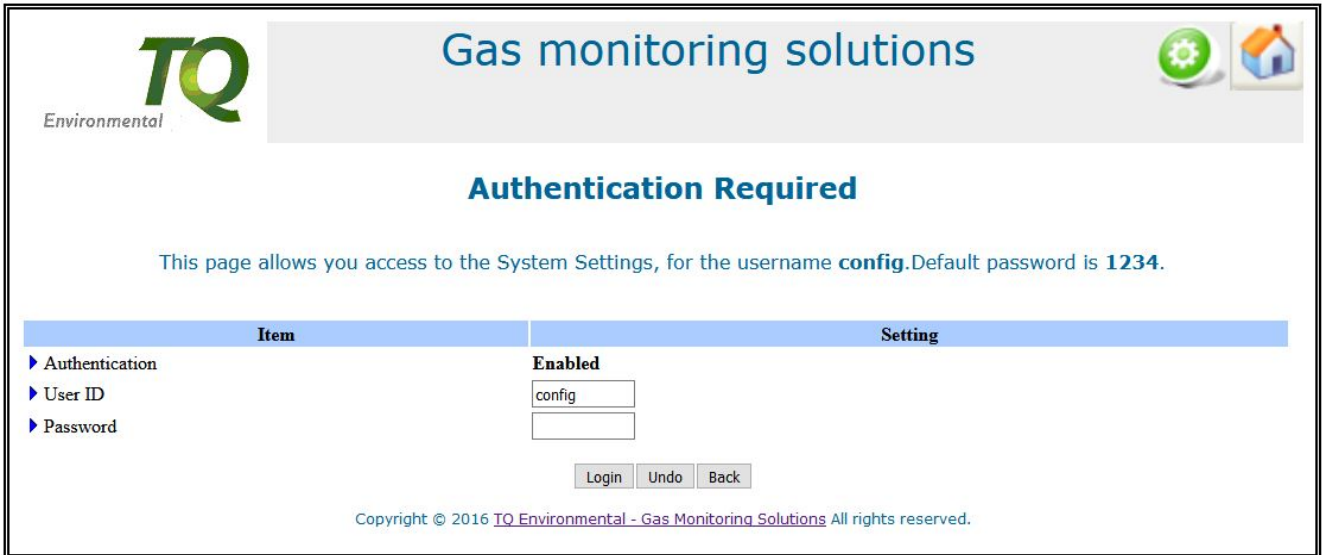


Figure 13 - Config Login Dialog Box

The default username is **config** and the default password is **1234**.

The Setup Page of the TQ32 Area Alarm Panel will now be displayed in the browser window as shown in Figure 14 below:



Figure 14 - TQ32 Area Alarm Panel Setup page

3.2 Network Page

This web page allows you to change the network properties of the TQ32 Area Alarm Panel, including the IP address, Subnet Mask, Default Gateway, Primary and Secondary DNS Servers and the Unit Station Number for MODBUS purposes. When you click on the link then the web page shown in Figure 15 is displayed.

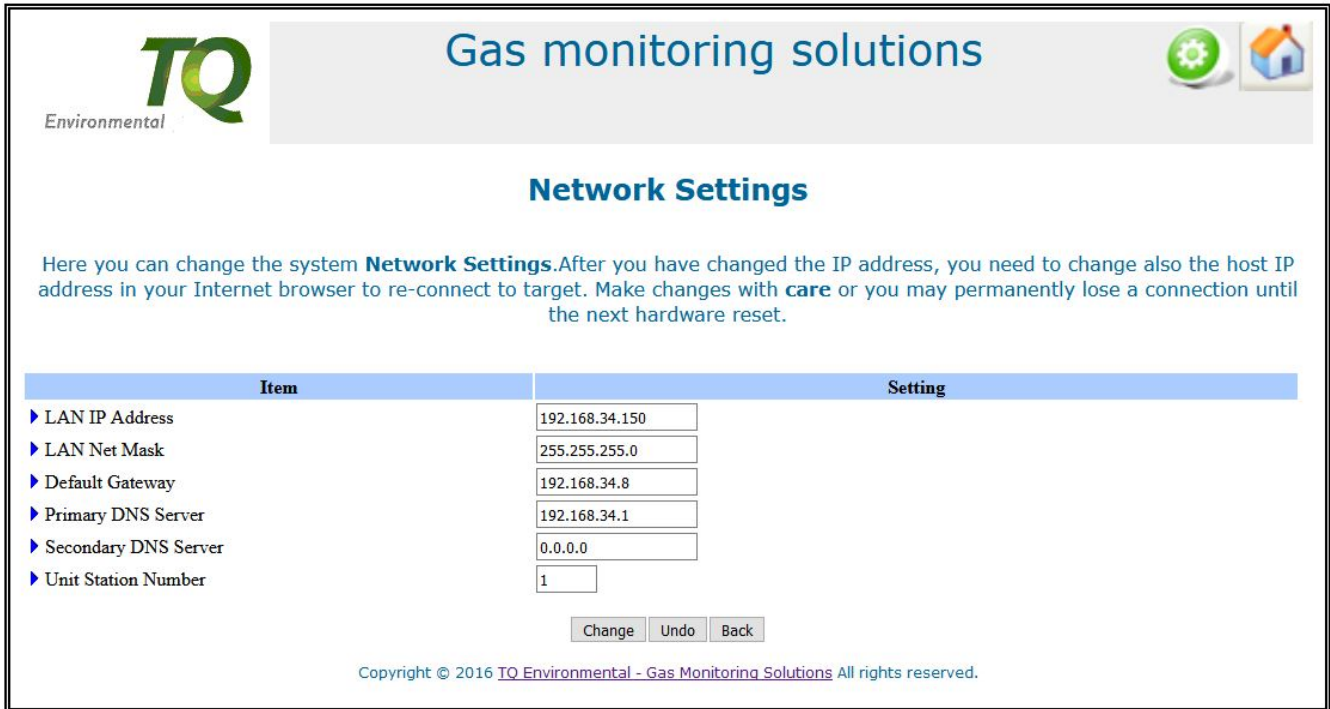


Figure 15 - Network Settings Page

IP Address:

The new IP address can be entered into the web page dialog box as shown above. After this has been done, if no other changes are to be made, the user must click the Change button to send the values to the TQ32 Area Alarm Panel. The new IP address will be effective immediately. After the IP address has been changed, you need to also change the host IP address in your internet browser to re-connect to the TQ32 Area Alarm Panel. Make changes with care or you may permanently lose a connection until the next hardware reset. Clicking the Back button will take the user back to the Setup Page.

Subnet Mask:

In computer networks, a **subnetwork** or **subnet** is a range of logical addresses within the address space that is assigned to an organisation. The subnet mask is used to inform the TQ32 Area Alarm Panel that it must send its replies to the gateway if the IP address of the PC is on a different network. When the subnet mask is set to “0.0.0.0” then it is effectively disabled and the Default Gateway is not used. A typical subnet mask would be “255.255.255.0”.

Default Gateway:

A Default Gateway is a node (a router) on a computer network that serves as an access point to another network. In enterprises, however, the gateway is the computer that routes the traffic from a PC to the outside network that is serving the web pages. It is only necessary to configure the default gateway IP address if the PC that is accessing the TQ32 Area Alarm Panel is on a different network.

Primary/Secondary DNS Server:

The Domain Name System (DNS) is a hierarchical distributed naming system for computers, services, or any resource connected to the internet or private network. It translates domain names meaningful to humans into the numerical identifiers associated with networking equipment for the purpose of locating and addressing these devices worldwide.

Unit Station Number:

The MODBUS 'slave address' field usually used on MODBUS Serial Line is used to communicate via devices on the MODBUS network. This field is a unique address on the MODBUS network in use.

3.3 System Page

This web page allows the TQ32 Area Alarm Panel passwords to be changed. Hovering the mouse over the **System** link on the Setup Page displays two additional links; **admin Password** and **config Password**. Clicking the admin Password link will display the web page shown in Figure 16.

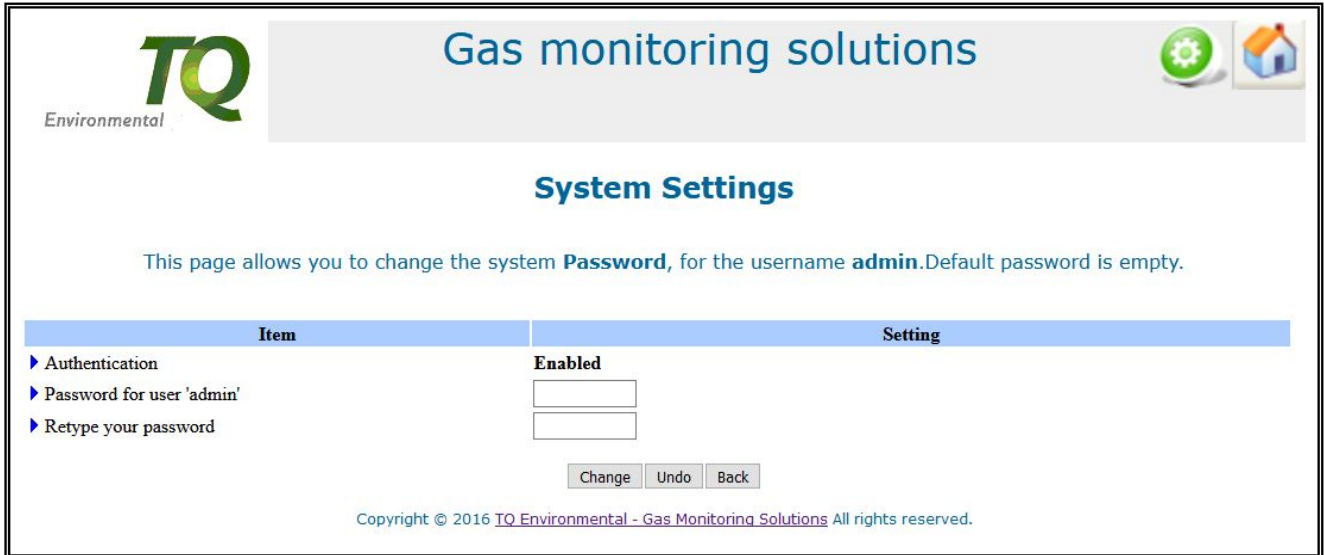


Figure 16 - admin Password Page

The user must click the **Change button** to send the values to the TQ32 Area Alarm Panel. Clicking the Back button will take the user back to the Setup Page.

Clicking the config Password link will display the web page shown in Figure 17 below.

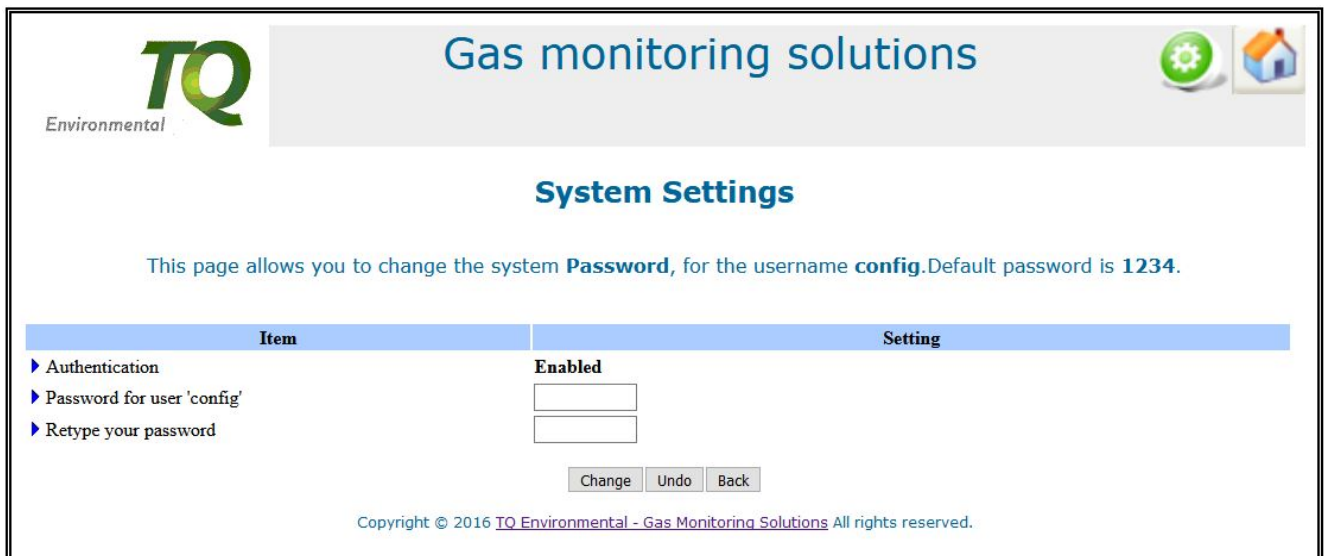


Figure 17 - config Password Page

3.4 Statistics Page

This web page shows the network connection status of the TQ32 Area Alarm Panel. This may be useful for network diagnostic purposes. The web page shown in Figure 18 is displayed when the link on the Setup page is clicked.

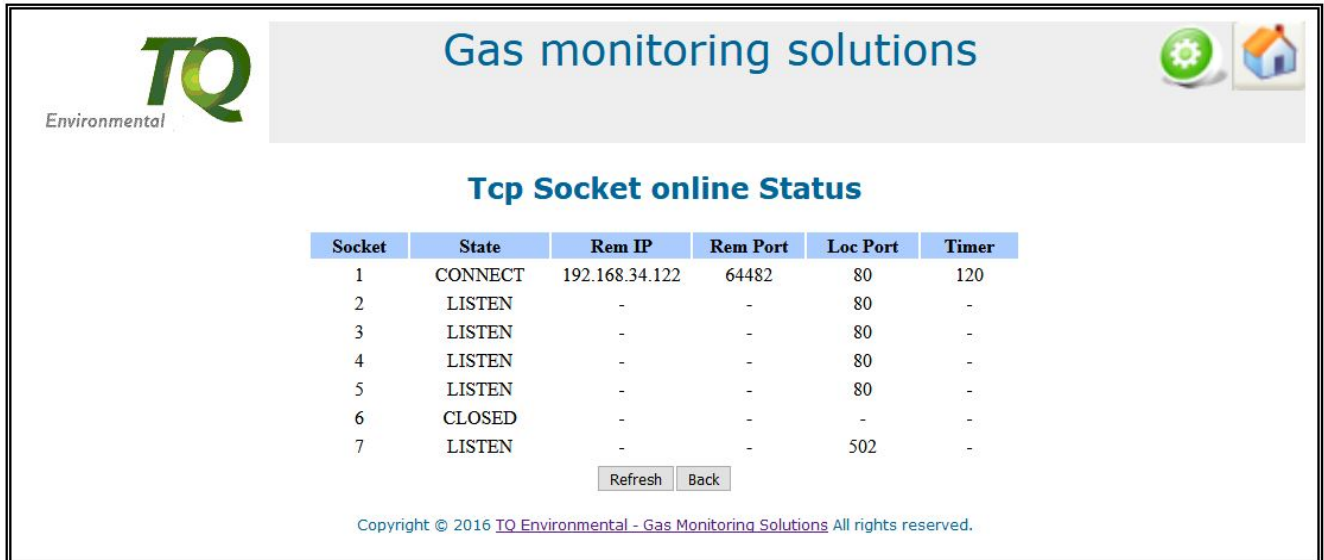


Figure 18 - Statistics Page

This page will be automatically refreshed every five seconds, or the user may manually refresh the page by clicking the Refresh button.

3.5 Locations Page

This web page allows the configuration of the locations; it is shown in Figure 19 below. Each sensor on the network must be identified with a 3 Digit Room Number to be displayed on the TQ32 Area Alarm Panel. When a sensor goes into an alarm condition the Room Number is used to identify the sensor in alarm. A Station Number is used for MODBUS output. Valid station numbers are 1-247.

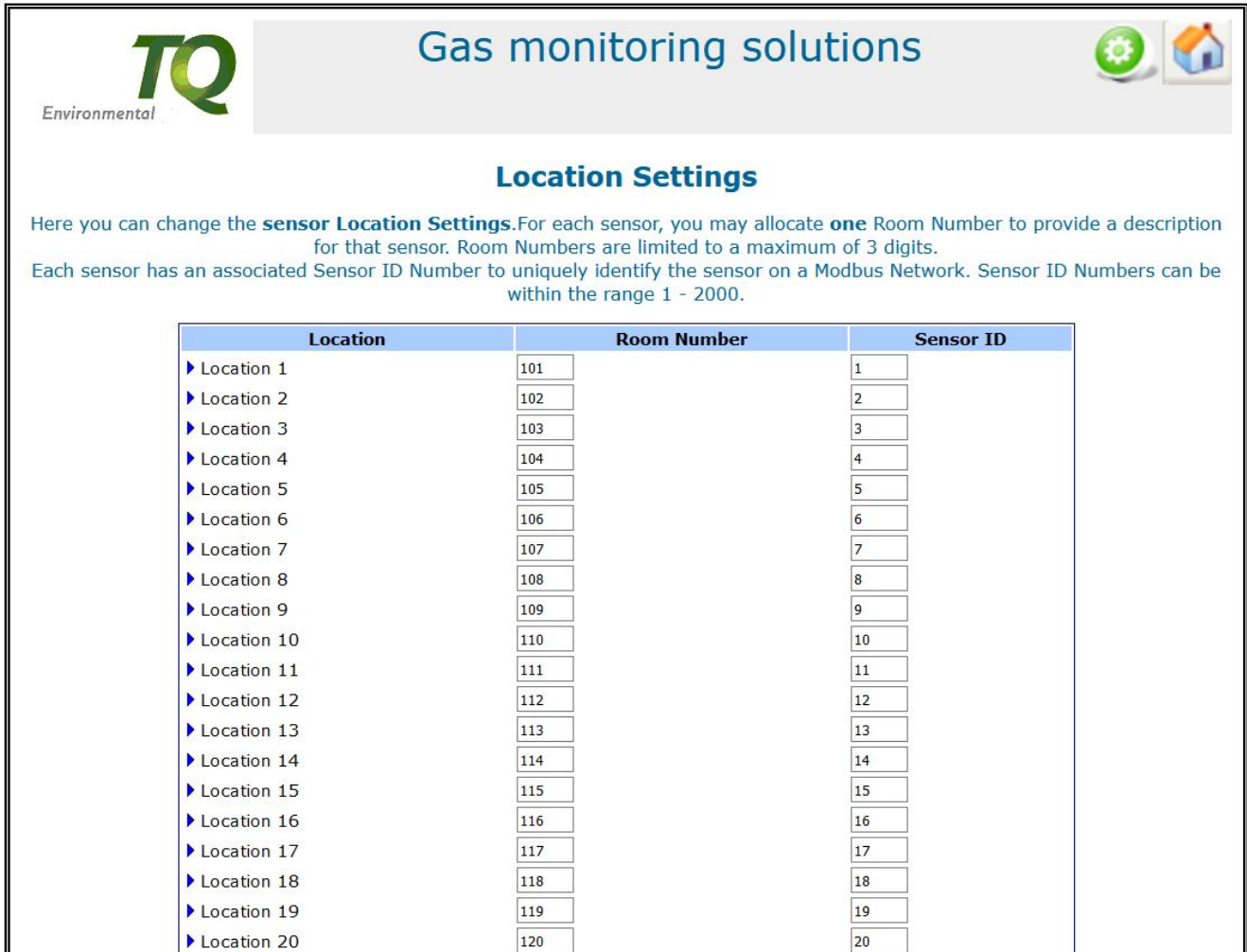


Figure 19 - Locations Page

The user must click the **Change button** to send the values to the TQ32 Area Alarm Panel. Clicking the Back button will take the user back to the Setup Page.

After making changes to locations 33 – 64 and clicking the **Change button** to confirm. It is also advisable to check the locations 1 – 32 page and also click the **Change button**, even if no changes have been made to this page.

Once all changes have been made, it is recommended to cycle the power to the panel to ensure all new setting are loaded.

3.6 Relays Page

This web page allows the configuration of the Common Relays. When the user hovers over this link, a drop-down menu appears that allows the Common Relays to be configured and the Relay Locations to be configured. Config Relay option is shown in Figure 20 below.

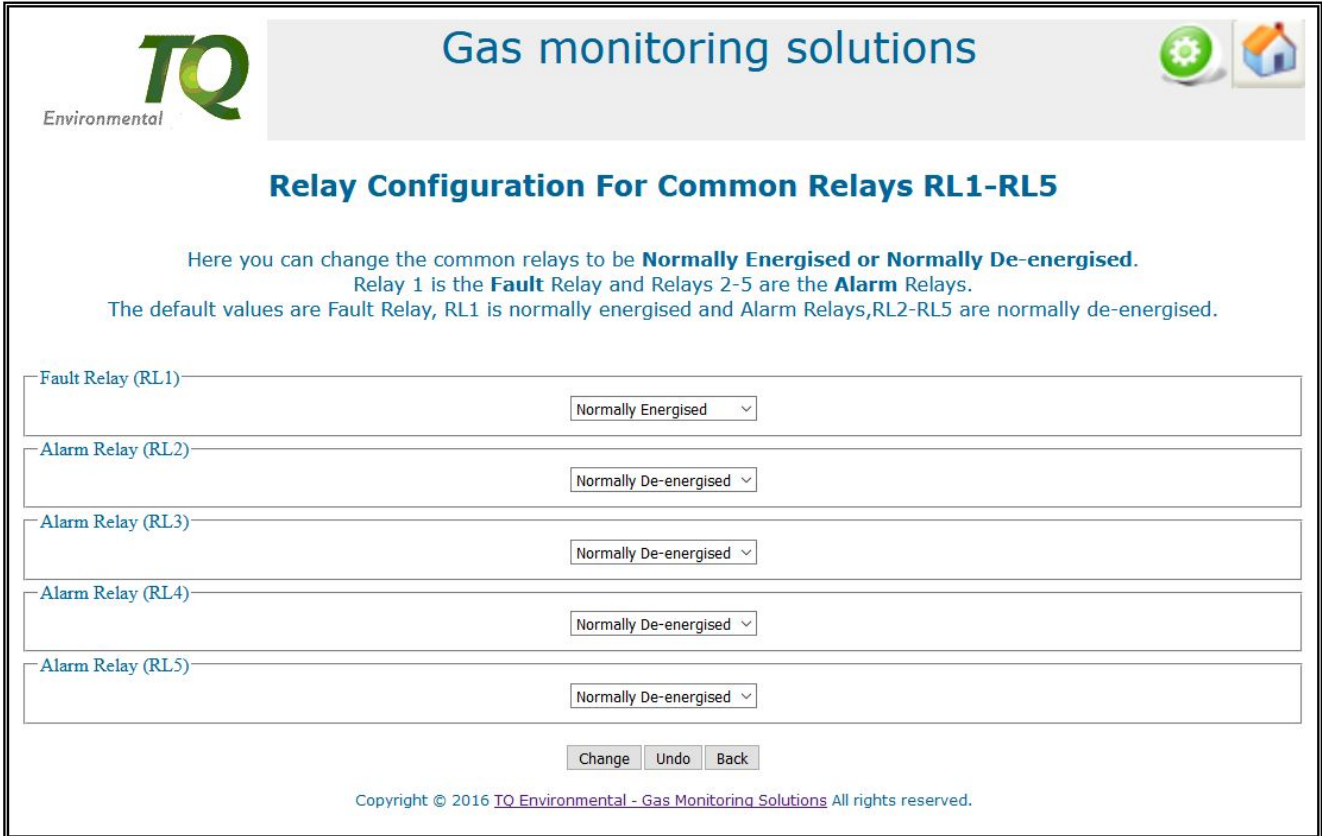


Figure 20 - Config Relays Page

Relay 1 (RL1) is designated the Fault relay whereas Relays 2 to 5 are designated common alarm relays. This web page will allow the configuration of all the common relays to be either normally energised or normally de-energised.

The user must click the Change button to send the values to the TQ32 Area Alarm Panel. Clicking the Back button will take the user back to the Setup Page.

It is also possible to select the common alarm relays (RL2-RL5) to be activated/de-activated on a location by location basis thereby enabling the grouping of relays as in Figure 21.

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Relay Settings

Here you can change the **Relay Configuration Settings**. For each location, you may allocate which relay/s to activate on an alarm condition.

Location	Relay 2	Relay 3	Relay 4	Relay 5
▶ Location 1	<input checked="" type="checkbox"/> Relay 2	<input checked="" type="checkbox"/> Relay 3	<input type="checkbox"/> Relay 4	<input type="checkbox"/> Relay 5
▶ Location 2	<input checked="" type="checkbox"/> Relay 2	<input checked="" type="checkbox"/> Relay 3	<input type="checkbox"/> Relay 4	<input type="checkbox"/> Relay 5
▶ Location 3	<input checked="" type="checkbox"/> Relay 2	<input checked="" type="checkbox"/> Relay 3	<input type="checkbox"/> Relay 4	<input type="checkbox"/> Relay 5
▶ Location 4	<input checked="" type="checkbox"/> Relay 2	<input checked="" type="checkbox"/> Relay 3	<input type="checkbox"/> Relay 4	<input type="checkbox"/> Relay 5
▶ Location 5	<input checked="" type="checkbox"/> Relay 2	<input checked="" type="checkbox"/> Relay 3	<input type="checkbox"/> Relay 4	<input type="checkbox"/> Relay 5
▶ Location 6	<input checked="" type="checkbox"/> Relay 2	<input checked="" type="checkbox"/> Relay 3	<input type="checkbox"/> Relay 4	<input type="checkbox"/> Relay 5
▶ Location 7	<input checked="" type="checkbox"/> Relay 2	<input checked="" type="checkbox"/> Relay 3	<input type="checkbox"/> Relay 4	<input type="checkbox"/> Relay 5
▶ Location 8	<input checked="" type="checkbox"/> Relay 2	<input checked="" type="checkbox"/> Relay 3	<input type="checkbox"/> Relay 4	<input type="checkbox"/> Relay 5

Change Undo Back

Figure 21 - Relay Locations Page

The user must click the Change button to send the values to the TQ32 Area Alarm Panel. Clicking the Back button will take the user back to the Setup Page.

3.7 RS485 Serial Comms Page

This web page, shown in Figure 22, allows the configuration of the three RS485 Serial Ports.

The screenshot shows a web interface for configuring RS485 Modbus Communications Settings for COM 1. The page has a header with the TQ Environmental logo and the text 'Gas monitoring solutions'. Below the header, the title 'RS485 Communications Settings For COM 1' is displayed. A sub-header explains that users can change the system settings, with default values of 19200 Baud Rate, 8 Data Bits, Even parity, and 1 Stop Bit. The main content area contains four dropdown menus: Baud Rate (set to 19200), Data Bits (set to 8), Parity (set to Even), and Stop Bits (set to 1). At the bottom of the form are three buttons: 'Change', 'Undo', and 'Back'. A copyright notice at the very bottom reads 'Copyright © 2016 TQ Environmental - Gas Monitoring Solutions All rights reserved.'

Figure 22 - RS485 Serial Comms Page

The user must click the Change button to send the values to the TQ32 Area Alarm Panel. Clicking on the Home icon will return the user to the Home Page or clicking on the Back button to take the user back to the Setup Page.

4.0 Operation

When power is supplied to the TQ32 Area Alarm Panel the green system health indicator on the front panel will be illuminated. This will remain illuminated as long as power is being supplied. The TQ32 Area Alarm Panel will then continuously monitor all of the Alarm Inputs.

When the Alarm Inputs to the TQ32 Area Alarm Panel are in the non-alarm condition, the 3 Digit 7-segment LED Display will flash three dots continuously.

When an alarm condition is detected by any room sensor; the red Alarm indicator on the front panel will be illuminated and the audible alarm will sound a 'Single Alarm' condition tone, the relay outputs will activate and the 3 Digit 7-segment LED Display will illuminate with the Room Number associated with the alarm location.

If more than one alarm condition is detected; the red Multi-Alarm indicator will flash and the audible alarm will sound a 'Multiple Alarm' condition tone, the 3 Digit 7-segment LED Display will alternate between the relevant Room Numbers associated with the alarm locations at 5 second intervals. It is possible to manually cycle through the Multiple Alarms by pressing the 'Next' Button on the front panel.

The TQ32 audible alarm can be silenced by pressing the 'Mute' Button on the front panel. Any new alarms will again activate the audible alarm. Room sensor alarms will only silence when the alarm condition has cleared.

Note: Before muting any alarms always use the "Next" button to cycle through all locations that may be in alarm, as alarm locations will clear automatically once the alarm has been muted and any refrigerant has cleared. This may result in multiple locations being lost if locations are not cycled and room numbers noted.

When the alarm conditions have cleared the alarm indicators and the relay outputs will turn off automatically.

5.0 Modbus

The TQ32 Area Alarm Panel has an RS485 Serial Modbus interface on COM1. The default communication settings are 19200 Baud Rate, 8 Data Bits, Even Parity and 1 Stop Bit. These can be changed in the Setup Page by clicking on the RS485 Serial Comms link. The following tables show the Modbus Register Addresses for the TQ32 Area Alarm Panel.

Input Register (Function 04)	Input Register Number	Number of Registers	Number of Bytes		
Station Number	30001	1	2		
Discrete Inputs (Function 02)		Discrete Inputs (Function 02)			
Alarm Status	Input Number	Alarm Status	Input Number		
Location 1	10001	Location 33	10033		
Location 2	10002	Location 34	10034		
Location 3	10003	Location 35	10035		
Location 4	10004	Location 36	10036		
Location 5	10005	Location 37	10037		
Location 6	10006	Location 38	10038		
Location 7	10007	Location 39	10039		
Location 8	10008	Location 40	10040		
Location 9	10009	Location 41	10041		
Location 10	10010	Location 42	10042		
Location 11	10011	Location 43	10043		
Location 12	10012	Location 44	10044		
Location 13	10013	Location 45	10045		
Location 14	10014	Location 46	10046		
Location 15	10015	Location 47	10047		
Location 16	10016	Location 48	10048		
Location 17	10017	Location 49	10049		
Location 18	10018	Location 50	10050		
Location 19	10019	Location 51	10051		
Location 20	10020	Location 52	10052		
Location 21	10021	Location 53	10053		
Location 22	10022	Location 54	10054		
Location 23	10023	Location 55	10055		
Location 24	10024	Location 56	10056		
Location 25	10025	Location 57	10057		
Location 26	10026	Location 58	10058		
Location 27	10027	Location 59	10059		
Location 28	10028	Location 60	10060		
Location 29	10029	Location 61	10061		
Location 30	10030	Location 62	10062		
Location 31	10031	Location 63	10063		
Location 32	10032	Location 64	10064		
Communications Protocol					
Baud Rate	Data Bits	Parity	Stop Bits	Transmission	Error Check
19200	8	Even	1	RTU	CRC-16

Table 1 – Modbus Address Registers (default)

6.0 Technical Specification

Dimensions	Height 364 mm	Width 284mm	Depth 120mm
Weight	Approx. 1Kg		
Mounting	Wall Mounted		
Temperature Range	-10 °C / +40 °C Non-Condensing		
Humidity	Up to 95% Non-Condensing		
Number of Alarm Inputs	32 Standard, 64 Expandable		
Input Supply Voltage	100V-240V 50/60Hz AC		
Power Consumption	Typ. < 1W		
Maximum Switching Current	2A		
Relays	5 x Voltage Free Contacts Non-Latched Normally Open/Closed Normally Energised/De-energised		
Push Buttons	Mute Button Cycle Alarms Button Test Button		
Indicators	Power On: Alarm: Multiple Alarm: Alarm Location:	Green LED Red LED Flashing Red LED 3 Digit LED Display	
Sounder	Magnetic Sounder	Min. 85dB @10cm	2KHz Tone

Table 2 - Technical Specifications



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