

# TQ126

Single point alarm system

## OPERATING MANUAL

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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.**

## 1 TQ 126 Single Point Alarm system

The **TQ126** interfaces directly to the TQ122 sensor and together they form a single point alarm unit or a stand alone readable sensor and are suitable for mounting in non hazardous areas:

**WARNING THE TQ126 IS NOT CERTIFIED TO BE USED IN HAZARDOUS AREAS.**

### 1.1 Stand alone Alarm unit: Description

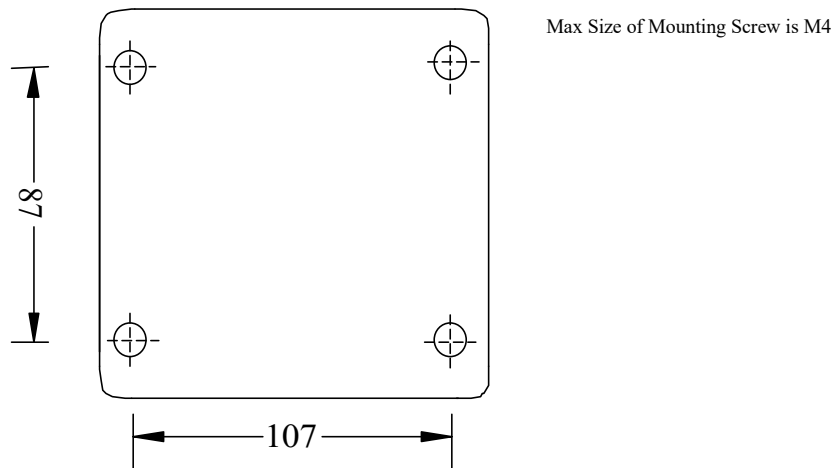
The unit requires to be powered by 24volts and this can be supplied locally using a RPB126 power supply unit or from other equipment. The specification for the i/p volts is 24 volts  $\pm$  5 volts. Any external power supply should be smoothed with a ripple content of less than 5%.

The unit is housed in a plastic box. The pcb has a ground plane which assists in RFI and EMC screening. The sensor element is used in a metal enclosure and generates a 4-20mA signal which feeds directly into the pcb.

The unit contains two alarm relays which can be configured to alarm at any particular level of gas either rising or falling. The relays are a single pole changeover and contacts rated 5A. It is not recommended to switch any A.C. currents.

#### 1.1.1 Mounting the unit:

Remove the display front by the four securing bolts. Then mark the position of the holes to secure it to the wall, in accordance with Figure 1.



**Figure 1 - Showing the mounting hole positions**

Mount the head in a position suitable for the gas being detected. The sensor head must always face downwards. For specific advice on positioning of the sensor please consult TQ.

**WARNING TAKE GREAT CARE TO ENSURE THAT NO SWarf ENTERS THE HOUSING AND THAT NO UNDUE TENSIONING IS PUT ON THE CABLES GOING TO THE DISPLAY.**

**WARNING POWER SHOULD NOT BE APPLIED TO THE UNIT UNTIL THE INSTALLATION IS TOTALLY COMPLETED.**

### 1.1.2 Connection detail:

The **TQ126** should be connected as shown in Figure 2.

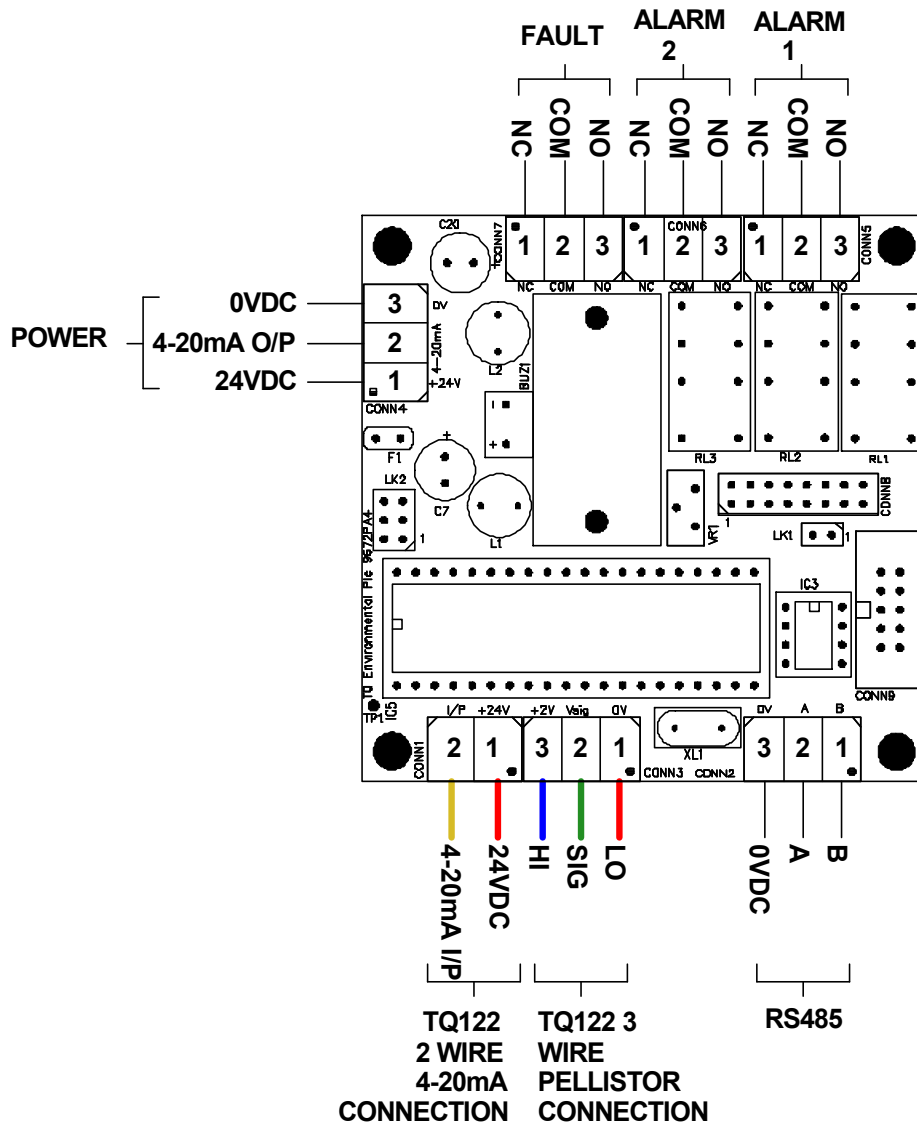


Figure 2 -Showing the connection Details and Button Positions

## 2 SYSTEM SOFTWARE

This section explains in detail the system set-up and operation of the **TQ126**. Three keys are used to navigate through and access the system software functions, namely: *MENU*, *UP*, and *DOWN*.

### 2.1 System Start-up

When the system is first powered up or a hardware system reset occurs, the **TQ 126** will boot up showing the Start-up screen in Figure 3 below:

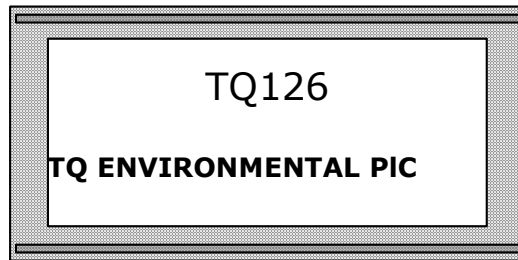


Figure 3 - Showing the start-up display

Following these two screens will be displayed showing the software version information. Then following this the system will download the previous setup parameters into system memory from the non-volatile serial RAM. This stage is indicated on the liquid crystal display by Figure 4 shown below:

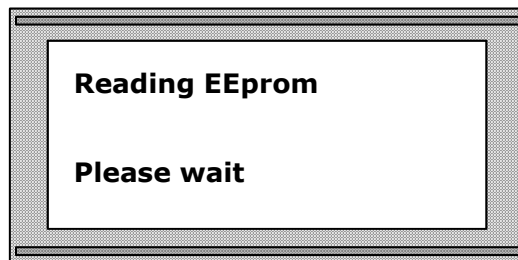


Figure 4 - Showing the initialisation screen

## 2.2 Main Operation

The **TQ126** will then enter its normal operation screen. This is shown in

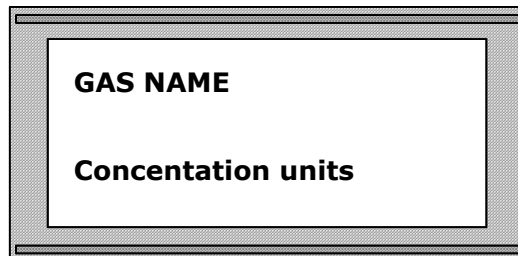
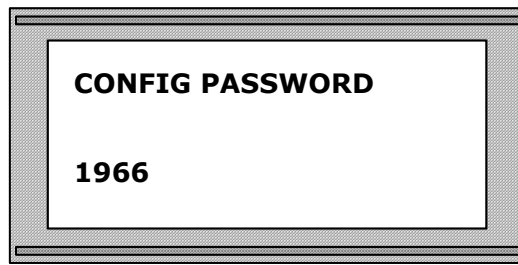


Figure 5 - Showing the Main Screen

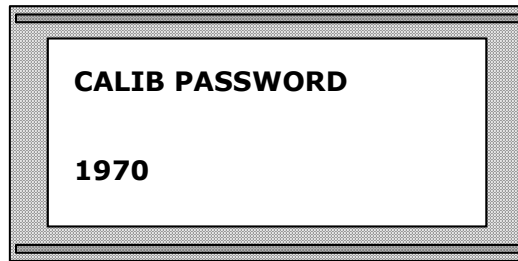
## 2.3 Menu Options

On the **TQ126** there are two menu modes, "Calib"ration and "Config"uration. Both are password protected. The default password for the calibration menu is 1970 and for the configuration menu is 1966. If the password is entered for the configuration menu and not for the calibration then the calibration menu options are not displayed, and vice versa. However if the password for both the calibration and the configuration menu is entered then all the menu options are available.

To gain access to a Menu Mode, the user must first press the menu button. The **TQ126** will then prompt for the config password. Then the user must enter the password from above. The code must be selected and entered as a whole. The *UP* and *DOWN* keys are used to scroll through the numbers. When the desired number is displayed, pressing the *Menu button* will ENTER that number.



**Figure 6 - Config Password Prompt**



**Figure 7 – “Calib”ration Password Prompt**

After the four digits have been entered the system will check the entered password against the correct password. If the entered password is correct, the display will indicate this by displaying that the password has been accepted. The system will then ask for the “CALIB”ration password. The above process for entering the password should be followed. The system will now select selected menu options. If the entered password is incorrect the display will indicate this by displaying that the password is not accepted.

**WARNING RESET THE TQ126 AFTER THE SET UP HAS BEEN ALTERED.**

It is strongly recommended that the TQ126 is restarted after any menu operations have been carried out. This prevents unauthorised changes to the unit. It also ensures that the changes has been stored correctly in the unit. There is a time out on the menu of 1 hour. If the user leaves it in menu mode then the unit returns to normal operation after one hour. However the TQ126 may be unstable as changes will not have stored correctly.

## 2.3.1 Configuration Options

### 2.3.1.1 Inhibiting Sensors

The first menu option is to inhibit/uninhibit the system. If the sensor is inhibited then any alarms / faults present on the sensor will not be acted upon.

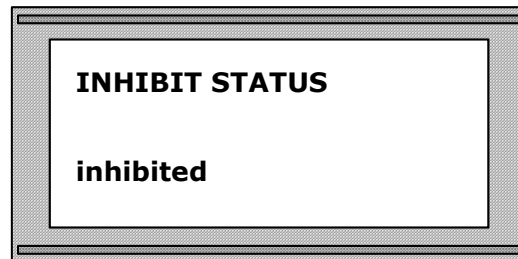


Figure 8 - Inhibit Selection screen

The status can be changed by pressing the UP and DOWN buttons. When the option is set then press the MENU button to enter the next set-up parameter.

### 2.3.1.2 Gas Name

The next menu option is to set the gas name for the sensor. The **TQ126** has the 29 gas names preset into the system a selection can be made from the following list:-

Gas Number	Gas	Screen Display (same as text if not given)	Gas Number	Gas	Screen Display (same as text if not given)
0	No gas ("		15	Hydrogen Sulphide	H2S
1	Acetone	Acetone	16	Hydrogen Chloride	HCL
2	Acetylene	Acetylene	17	Hydrogen Cyanide	HCN
3	Butane	Butane	18	General Hydrocarbon	Hy carb
4	Methylene chloride	CH2CL2	19	Hydrofluric Acid	
5	Methyl chloride	CH3CL	20	Liquid Petoleum Gas	LPG
6	Methane	CH4	21	Ammonia	NH3
7	Chlorine	CL2	22	Nitric Oxide	
8	Carbon Monoxide	CO	23	Oxygen	O2
9	Carbon Dioxide	CO2	24	Ozone	O3
10	Phosgene	COCL2	25	Petrol Vapour	
11	Ethylene Oxide	ETO	26	Propane	
12	FLAMMABLE		27	Smoke	
13	Gas		28	Sulphur Dioxide	SO2
14	Hydrogen	H2	29	Solvent	
			30	Refrigerant	

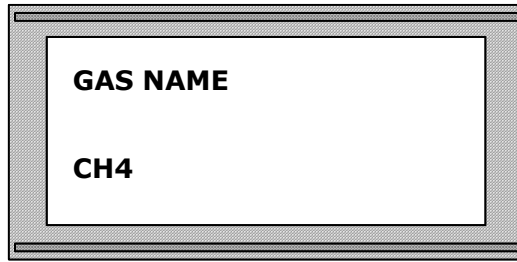


Figure 9 - Gas selection menu option

The gas name is scrolled through by pressing the UP and DOWN buttons. When the option is set then press the MENU button to enter the next set-up parameter.

### 2.3.1.3 Gas Units

The next menu option is to set the units used when displaying the concentration on the screen. The following units can be chosen.

- % LEL
- % Vol
- ppm
- units
- No Units <Space>

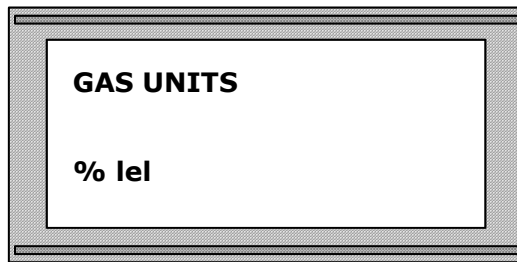


Figure 10 – Gas Units selection screen

The units can be changed by pressing the UP and DOWN buttons. When the units are correct then press the MENU button to enter the next set-up parameter.

### 2.3.1.4 Sensor Type

The **TQ126** works with two types of sensor. A Pellistor sensor e.g. TQ122 flammable or a 4-20mA output sensor e.g. TQ122 Oxygen. The type of the sensor is set in the next menu option again this selected using the UP and DOWN button until the correct setting is found. Press the MENU option and the system will move onto the next menu.

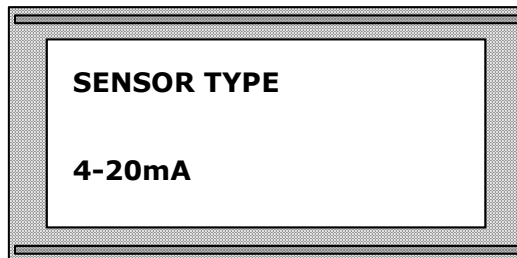


Figure 11 – Gas Units selection screen



### 2.3.1.5 Other menu options

The following table gives a description of the other menu options.

Menu Option	Description	Settings
Precision	This is the number of places to which the concentration is displayed.	Press the UP or Down to alter the value.
Lower Limit	This is the lowest concentration that will be displayed on the screen. So if the concentration drops below this setting then the screen will always show this setting.	Press the UP or Down to alter the value. 0 is the default value
Range	This is the range of the sensor	Press the UP or Down to alter the value.
Bridge Voltage	This allows the input voltage from a Pellistor to be calibrated This is only available if the "Calib"ration password has been entered. For the procedure See Section 2.3.1	
Zero Calibration	This is only available if the "Calib"ration password has been entered. For the procedure See Section 2.3.1. This also is only available with a 4-20 mA sensor	
Digital Zero Now	This is only available if the "Calib"ration password has been entered. For the procedure See Section 2.3.1. This also is only available with a 4-20 mA sensor	
Zero Current	This is only available if the "Calib"ration password has been entered. For the procedure See Section 2.3.1	
4-20mA Zero now	This is only available if the "Calib"ration password has been entered. For the procedure See Section 2.3.1	
Span Calibration	This is only available if the "Calib"ration password has been entered. For the procedure See Section 2.3.1 This also is only available with a 4-20 mA sensor	
Digital Span Now	This is only available if the "Calib"ration password has been entered. For the procedure See Section 2.3.1 This also is only available with a 4-20 mA sensor	
Span Current	This is only available if the "Calib"ration password has been entered. For the procedure See Section 2.3.1. This also is only available with a 4-20 mA sensor	
4-20mA span now	This is only available if the "Calib"ration password has been entered. For the procedure See Section 2.3.1	
Alarm 1	This is the value at which the first alarm triggers	Press the UP or Down to alter the value.
Alarm 1 trigger	This allows the alarm to be set so that it is either a rising (+) or a falling (-). A rising alarm is raised if the value goes above the setting. A falling alarm is raised if the value goes below that setting.	Press the UP or Down to toggle between + or -

Menu Option	Description	Settings
Alarm 2	This is the value at which the first alarm triggers	Press the UP or Down to alter the value.
Alarm 2 trigger	This allows the alarm to be set so that it is either a rising (+) or a falling (-). A rising alarm is raised if the value goes above the setting. A falling alarm is raised if the value goes below that setting.	Press the UP or Down to toggle between + or -
Alarm/FLT latch	This allows all alarms and faults to be raised to be latched or unlatched. If an alarm / Fault is raised and the setting is latched then the alarm stays activated until it acknowledged or reset.	Press the UP or Down to toggle between latched or unlatched.
Auto Zero	This setting activates a mechanism that zeros the sensor every 24 hours to make the reading say zero reliably	Press the UP or Down to toggle between "Auto Zero on " & "Auto Zero off"
Alarm/Flt Dwell	This is the time in seconds that the sensor has to be in alarm/fault before that alarm/Flt is raised.	Press the UP or Down to set a figure in seconds between 0 and 10 seconds.
Comms	This setting enables or disabled the RS485 MODBUS Output	Press the UP or Down to toggle between disabled or enabled.
Station	This menu option is only available when the RS485 MODBUS output is enabled	Press the UP or Down to set the station number between 1 and 32.
Comms Time Out	This Menu option is the time in seconds at which a communication error is raised. It is the period of time between MODBUS master polls before an alarm is raised for failed communication	Press the UP or Down to set the time out between 1 and 40. Suggested value is 600s.

## 2.3.2 Sensor Calibration

It is recommended that the **TQ126** is calibrated every 6 months. This will ensure safe operation of the unit.

On a 4-20 ma sensor it is suggested to zero the sensor and set the zero on the 4-20ma First, then span the sensor.

### 2.3.2.1 4-20mA Sensor Zero

**WARNING this procedure should be carried out by Trained TQ service Engineers Only**

1. Enter the Calibration Menu.
2. Inhibit the sensor this is the first Menu option
3. Select the "Zero Calibration".
4. Apply a zero gas to the sensor
5. Press the UP and DOWN buttons until the screen displays the lower limit, set in earlier menus.
6. Press the MENU Button when happy with the value
7. The screen will now say "Digital Zero now". This is to show the user the setting you have just set and disregard this screen.

### 2.3.2.2 Pellistor Set up

**WARNING this procedure should be carried out by Trained TQ service Engineers Only**

1. Enter the Calibration Menu.
2. Inhibit the sensor this is the first Menu option
3. Select the "Bridge Voltage".
4. Press the UP and DOWN buttons until the **voltage measured at the sensor terminals** is 2.0v +/- 1% ( **2.5v for Petrol Sensors** ) you may need to set the displayed voltage higher than 2.0 volts with longer cable runs to allow for volt drops in the cable.
5. Press the MENU Button when happy with the value
6. The screen will now say "Press UP to Auto Balance the Bridge". Press the UP button and the operation will be performed automatically.
7. If the screen says "Having difficulty adjusting bridge". Then simply repeat the operation. If it occurs again the sensor should be investigated.

### 2.3.2.3 Zero 4-20mA Output Calibration

**WARNING this procedure should be carried out by Trained TQ service Engineers Only**

This allows the 4-20mA output to be calibrated

1. Enter the Calibration Menu.
2. inhibit the sensor this is the first Menu option
3. Select the "Zero Current".
4. Apply a zero gas to the sensor
5. Press the UP and DOWN buttons until the screen says the required output e.g. 4mA.
6. Press the MENU button when happy with the output
7. The screen will now say "4-20 Zero now". This is to show the user the setting you have just set and disregard this screen.

### 2.3.2.4 4-20 mA Sensor Spanning

**WARNING this procedure should be carried out by Trained TQ service Engineers Only**

This procedure allows the system to be calibrated to the sensor. You will need a suitable span gas for the system.

1. Enter the Calibration Menu.
2. Inhibit the sensor this is the first Menu option
3. Select the "Span Calibration".
4. Apply a Span gas to the sensor
5. Press the UP and DOWN buttons until the screen says the required concentration
6. Press the MENU button when happy with the output
7. The screen will now say "Digital Span now". This is to show the user the setting you have just set and disregard this screen.

### 2.3.2.5 4-20mA Output Span Calibration

**WARNING this procedure should be carried out by Trained TQ service Engineers Only**

This procedure allows the system to be calibrated to the sensor. You will need a suitable span gas for the system.

1. Enter the Calibration Menu.
2. Inhibit the sensor this is the first Menu option
3. Select the "Span Current Calibration".
4. Apply a Span gas to the sensor
5. Press the UP and DOWN buttons until the screen says the required output
6. Press the MENU button when happy with the output
7. The screen will now say "Digital Span now". This is to show the user the setting you have just set and disregard this screen.

## 2.4 Faults

During normal operation the following errors may be displayed on the screen.

<b>Fault</b>	<b>Description</b>	<b>Solution</b>
Fault High Output	This is when the TQ126 has an output that is greater than the range of the system	Recalibrate the sensor
Fault Low Output	This is when the TQ126 has an output that is lower than the lower limit of the system	Recalibrate the sensor
Hi/Low Output	This is when the TQ126 has experience and input that has caused a low output alarm and an high output alarm	Recalibrate the sensor. The sensor may need to be replaced.
Overrange	This is when the TQ126 has an output greater than 1% of the range of the sensor	Recalibrate the sensor. The sensor may need to be replaced.
Comms Fault	This is when the TQ126 has not received a correct MODBUS communication packet in the comms time out period set in the menu.	Check the Wiring and the MODBUS Master.



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