TQ4400 TANKSCAN
GAS SAMPLING SYSTEM

OPERATING MANUAL

© TQ Environmental Plc July 2009

This manual must not be copied or reproduced in part without the express written permission of TQ Environmental PLC. All information contained herein is subject to modification.

TQ Environmental Plc, Flanshaw Way, WAKEFIELD, W. Yorks, WF2 9LP
☎ **44 (0) 1924 380700;** FAX 44 (0) 1924 361700.
E-mail : Sales@TQPLC.com
Web Site : www.TQPLC.com

TQ ENVIRONMENTAL PLC BS EN ISO 9001

Date of Issue: 1st September 2002
Author: S Burgess

CONTENTS

1.0	**INTRODUCTION**	**3**
2.0	**SYSTEM DESCRIPTION**	**5**
2.1	**Pneumatics:**	**5**
2.2	**Sensors**	**10**
2.3	**Control and Display Electronics.**	**10**
2.4	**Power Supply Change Over Unit**	**14**
2.5	**Watchdog**	**14**
2.6	**Outputs.**	**15**
2.7	**Technical Specification**	**15**
3.0	**OPERATION**	**16**
3.1	**System Start-up**	**16**
3.2	**Normal Operation**	**16**
3.3	**Panel Controls**	**17**
3.4	**Alarm Conditions**	**19**
3.5	**Time and Date**	**21**
4.0	**INSTALLATION**	**22**
	(instalation notes are not included in this version)	
5.0	**COMMISSIONING**	**22**
	(commissioning notes are not included in this version)	
6.0	**SCHEDULED MAINTENANCE**	**23**
6.1	**System Confidence Test Sequential Sampling Part**	**23**
6.2	**Filter Check**	**23**
6.3	**System Calibration (All Sensors)**	**24**
6.4	**Pump Service**	**24**
6.5	**Inspecting and Cleaning Snorkel Valves**	**24**
6.6	**Testing and Calibrating the TQ126F**	**25**

Set up and Technician sub menus are not included in this version of the TQ 4400 operating manual. For all instructional on changing system parameters, further calibration instructions etc. Please request the following document from TQ Environmental sales office.

TQ 4400 Gas Detection System Set Up Manual **Document Ref: 4826CR2**

1.0 INTRODUCTION

The **TQ4400 Tankscan** is a multipoint, sequential, aspirated, gas sampling system. The System is designed to meet with IMO / Solas requirements, and comply with classification rules for monitoring 'Void Spaces' on board Gas Carriers and Oil & Gas Tankers, in areas adjacent to the cargo areas. E.g. ballast tanks, pump rooms, cofferdams, pipe tunnels and duct keels. Refer to Fig 1 on page 4 for a typical system schematic.

The **TQ4400 Tankscan** extracts a gas sample from a desired location, via transport lines to an analysing unit where the sample is monitored for 'Flammable', 'Toxic' or 'Oxygen' gases. This is a cost effective method of gas detection, as only one sensor is required per gas detected.

The number of locations for a **TQ4400** is dependant on the number of gases being detected. From 1 to 4 sensors and up to 48 locations. Typical explosive and toxic gas sensors, which can be installed within the **TQ4400,** can be seen in table 2, (other gases are available on request.)

Explosive	**Toxic**
Methane 0-100% LEL	H_2S Various ranges
Butane 0-100% LEL	CO Various ranges
Methane 0-100% VOL	CO^2 Various ranges
Butane 0-100% VOL	Oxygen 0-25% VOL

Table 2

The TQ4400 is capable of providing individual 'low' and 'high' alarm outputs for each sample location and corresponding individual alarm relays. These relays can be utilised when an application requires locations to be 'grouped' into 'zones'. This can provide an interface with alarm management systems, remote mimic panels, and audible / visual warning devices.

With the ability to monitor for the gases indicated above, the system can be configured to allow a 'Pump Room Gas Monitoring System' to be integrated into the TQ4400, thus eliminating the need for two separate systems.

The **TQ4400** Display Unit can be mounted within the cabinet or in a remote location, if for instance the analysing unit is installed in an un-manned area. The operator interface is via four push buttons and a backlit LCD. During normal operation the LCD display will provide the 'location', 'gas type' and sample 'concentration' for each individual location.

N.B. A separate SET UP Manual for changing 'sample line' No's., 'gas range' and 'alarm levels' is included. These are factory set to the customer's requirements, but can be altered on commissioning.

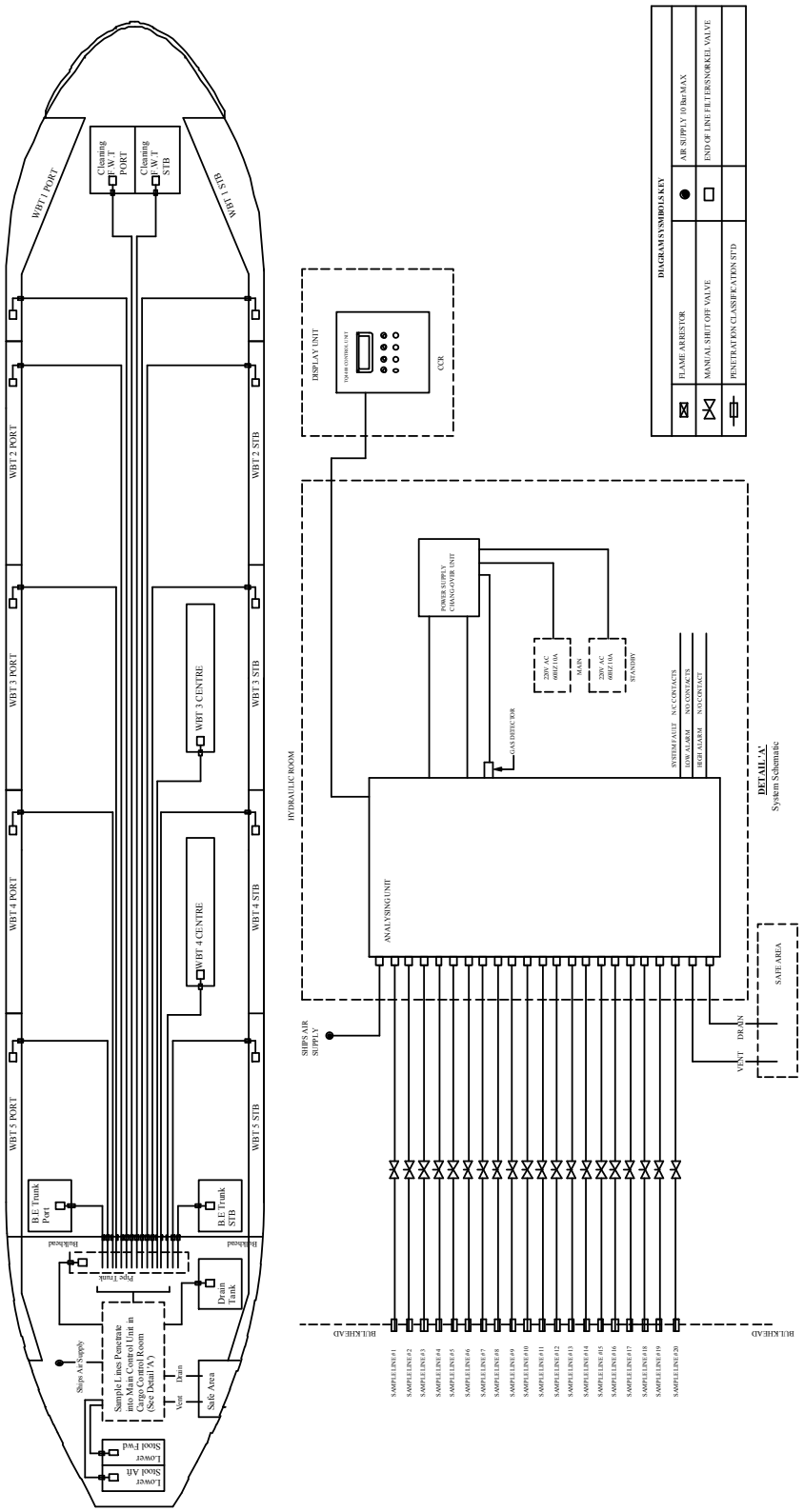


Fig 1 Typical 20 Point TQ4400 Tankscan System

2.0 SYSTEM DESCRIPTION

The **TQ4400 Tankscan s**tandard Analysing Unit is housed in a wall-mounted enclosure complete with front panel Display Unit. The enclosure contains all electrical, electronic and pneumatic equipment required to monitor, display, control and provide alarm outputs for the relevant locations. Refer to Fig 2, page 9 for a typical system schematic.

The TQ4400 system is divided into following main components:

- Pneumatics
- Sensors
- Control & Display Unit
- Power Supply Change Over Unit
- Sample Line Accessories
- Outputs
- Technical Specification

2.1 Pneumatics:

Please refer to Fig 2, 3, 4 and 5, pages 8, 9, 11 and 12 respectively.

Every Sample Line from the relevant Location is firstly connected to its respective external 'Shut-off Valve' to provide sample line isolation. The sample then passes through a flame arrestor mounted externally on either side of the cabinet, and into the Analyser Unit.

The typical Analysing Unit contains the following Pneumatic devices:

- Solenoid Valves
- Catch pot - water trap
- Particulate Filter
- Double Ended Pump
- Coalescing Filter
- Flow Meter
- Reverse Purge
- Leak Detection

2.1.1 The Solenoid Valves are mounted in blocks of eight onto a common manifold. The manifolds are fitted in pairs to a gland plate, which allows direct external connection to the input port of each valve.

Fitted onto each pair of manifolds is a Solenoid Driver Board. This board receives data from the BTC board to operate the solenoid valves.

Each valve is complete with a 24V dc coil, and connection to each coil is via 3 pole connector containing an LED and snubbing diode.

2.1.2 The Catch pot is fitted with a poly-carbonate bowl allowing visual inspection of the water levels. In the event of the bowl becoming full a float assembly will block the outlet, firstly to prevent water entering the system and secondly to create a Flow Fail Alarm.

To empty the bowl, firstly stop the pump and open the drain valve at the bottom of the bowl. When empty **Ensure** that the drain valve is fully closed prior to re-energising the pump.

2.1.3 The Particulate Filter is fitted with a micro-fibre filter element, which cannot be cleaned and therefore must be replaced when discoloured or is suspected of reducing air flow. This unit is also fitted with a poly-carbonate bowl to allow visual inspection of the filter element. Spare filter elements can be supplied, refer to Section 7 for Part numbers.

2.1.4 The Pump is an Industrial Double Ended type with the two pumps connected in series to ensure adequate flow rates for the larger installations. As an example on transport tube dimensions of 4.0mm I/D, flow rates in excess of 4 litres/min. are achievable for sample line lengths up to 300 metres. Based on these figures, sample times for a 300 metre sample line will be in the order of 1 minute, providing sharp bends and fittings are kept to a minimum. A Pump Service Kit can be supplied, refer to Section 7 for Part numbers.

2.1.5 The Coalescing Filter is of nylon construction and, as with the Particulate filter, incorporates a clear bowl for visual inspection of the filter and moisture level. Here again the element must be replaced when discoloured. The drain outlet is fitted with a needle valve, which is opened sufficiently to allow a small airflow through the Coalescing Filter all the time the pump is running. This should drain any moisture that has collected in the Filter bowl. Spare filter elements can be supplied, refer to Section 7 for Part numbers.

2.1.6 The Flow Meter is fitted in the sample flow line to indicate airflow to the sensors and works in conjunction with the Sample by-pass needle valve. The steel float, sensing ring and control relay, are all part of the flow fail device. If the float passes down through the sensor a Low Flow signal is sent to its' control relay. When flow returns the float will raise back through the sensor and the signal to its' control relay will revert to normal.

2.1.7 Reverse Purge: The system allows compressed air to be periodically blown down each sample line in order to keep the lines free of debris/moisture etc.
This "Reverse Purge" can be initiated individually on each sample line as required, globally on each sample line when required, or globally on each sample line automatically.

The compressed air, between 6 to 10 bar, is brought into the system through its own input port, and through a manual drain coalescing filter and pressure regulator.

2.1.8 A Leak Detection System is incorporated within the TQ4400 Analyser enclosure and monitors for any accumulation of flammable gases within the enclosure. This system utilises a catalytic flammable gas detector fitted in the top of the enclosure, which is connected to a TQ126F controller fitted in the Power Supply Change-over Unit, refer to section 2.4.

If the gas concentration within the enclosure exceeds 30% LEL the Power Supply Change-over Unit will disconnect the supply to the TQ4400 Analysing Unit. The power supply cannot be re-connected until the gas concentration has fallen below the alarm level and a manual reset at the Power Supply Change-over Unit has been carried out.

2.1.9 Sample Line Equipment is available in several forms to suit the sample location.

- End of Line filters for 'Dry' areas,
- Snorkel Valves for wet areas,
- In-line filter (where an End of line filter is not practical)

There are two types of **End of Line Filters**.

- A fibre element type where the filter element has to be replaced periodically.
- A stainless steel type where the filter element can be cleaned.

Both of the above filters are supplied with dual compression fittings to suit pipe sizes 6 or 8mm O/D, in either brass or stainless steel. It is advisable to protect the Filter when installed in a location where damage may occur.

The **Snorkel Valve** is of a nylon cylindrical construction with an internal float that will block the sample line when immersed in water. This device is supplied with a stainless steel dual ferrule compression fitting to suit pipe sizes 6 or 8mm O/D.

The **In-Line Filter** is a stainless steel unit that is suitable for attaching to a stop-valve when fitted in a stop valve box. It is advisable to remove the In-Line Filter complete for cleaning, as splitting the filter in situ may damage the threads. Refer to the Installation section 4.5 for Filter Drawings.

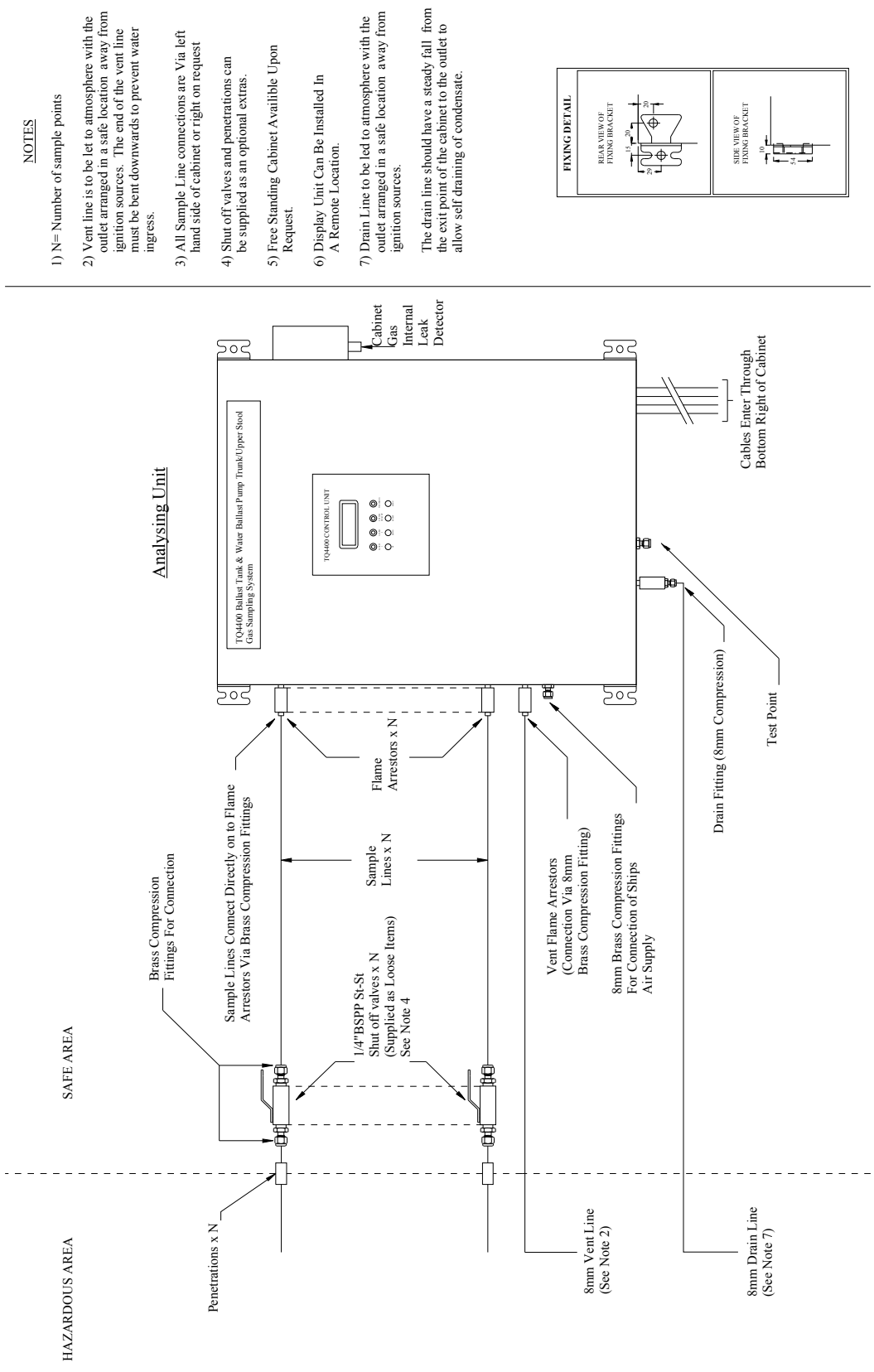


Fig 2 Typical System Schematic for a TQ4400 Tankscan

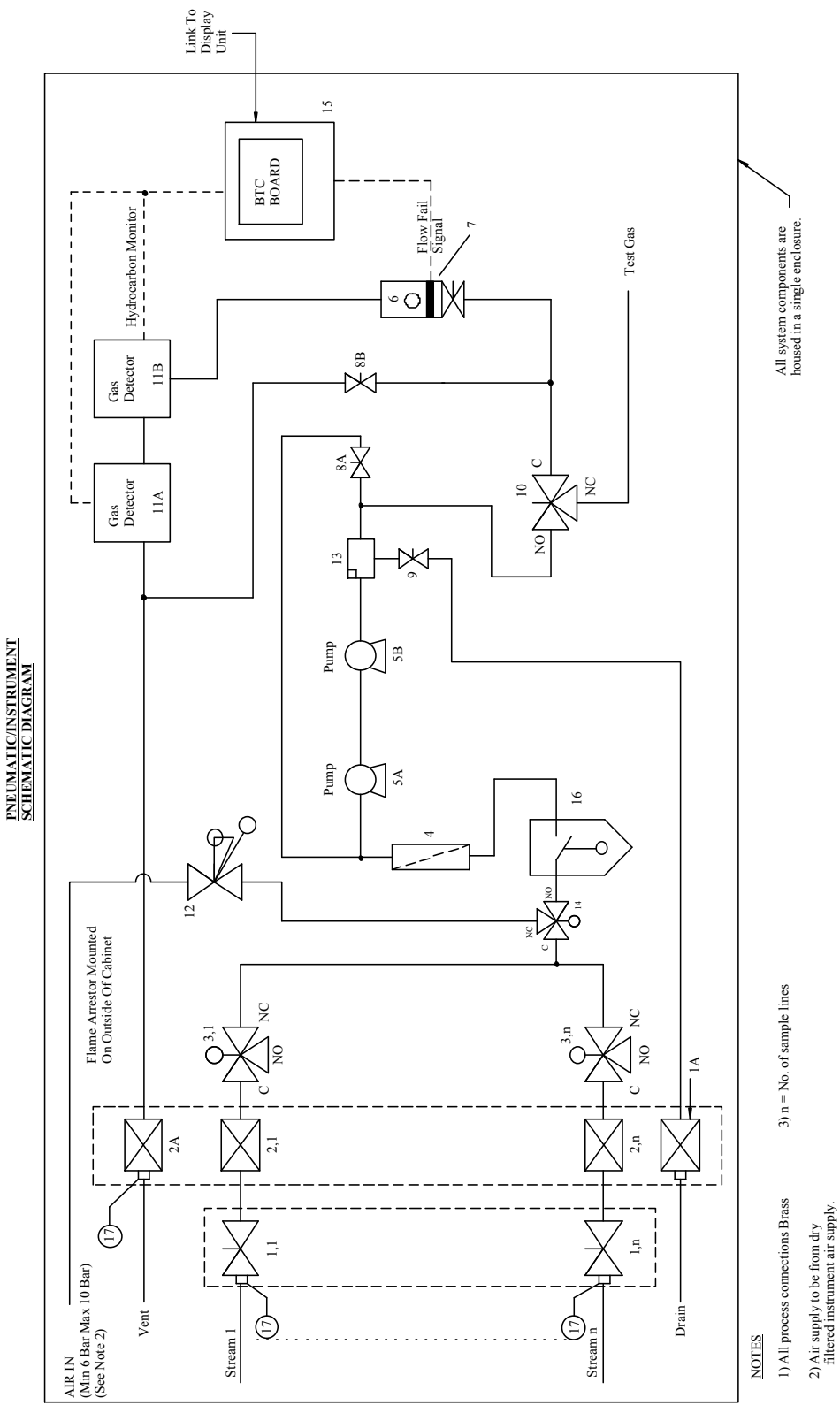


Fig 3 Typical Pneumatic Schematic for TQ4400 Tankscan -Please see separate Spare Parts List in Drawings section for Component identification an relevant part numbers.

2.2 Sensors

There are two type of sensors, the infrared type, for flammable gases, or the electro-chemical type for Toxic and Oxygen gases. When a system comprises of more than one sensor, they are connected in series in the sample line which then is vented out from the enclosure through a flame arrestor.

2.2.1 Infrared (GD 129NI) Flammable Gas Sensor.

The operation of the infrared sensor within the **TQ4400 Tankscan** system has been developed from the infrared heat source detector utilised in the thermal imaging cameras measuring infrared radiation. These detectors have now developed into non-dispersive infrared analysers, for accurate Flammable gas detection. Please see the separate GD 129 Manual for more information and maintenance requirements.

2.2.2 Electro-chemical Type.

These sensors typically monitor for Oxygen and Toxic Gases and because of their properties have a life span of approximately 2 years.

These Electrochemical type, as with the Infrared sensor, provide a 4-20mA signal for their respective gas concentrations.

2.3 Control and Display Electronics.

The **TQ4400 Tankscan** Analysing Unit is controlled by the micro-processor based Ballast Tank Controller (BTC) board.

The BTC board accepts hard wired inputs from the gas detectors, flow fail relay and communicates the system status to the Display Unit via a RS 485 serial link. System status consists of gas concentrations, system fault and alarm status, and current sample locations.

The Display Unit analyses the information and transmits back to the controller BTC board any system operations required, to operate gas concentration alarm relays, sample-line or reverse purge solenoid valves.

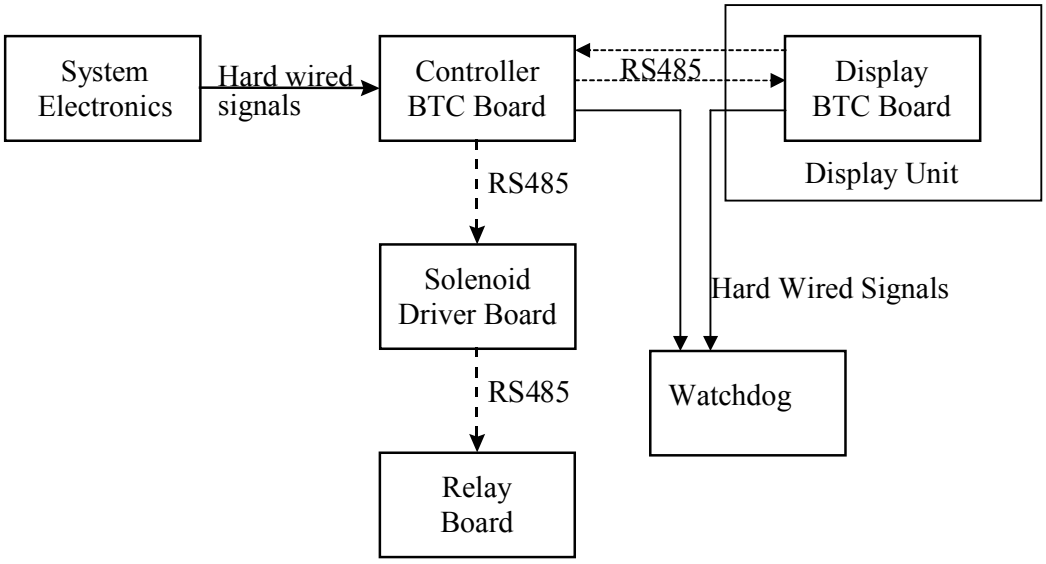


Fig. 6 Block diagram of Communications within TQ4400

Both the Control PCB and the Display PCB are constantly monitored by an individual watchdog unit. This alarms if the any or both of the processors on the relevant Board fail.

2.3.1 The Display Unit

Refer to Fig 7, Page 15
The Display Unit houses the display BTC board and the display/operator interface controls. The display BTC board accepts details of the system status from the controller BTC board, analyses the information, displays the current system status and sends control commands back to the main BTC unit.

During normal operation the Display Unit will show the current sample location, gas type, gas concentration and fault alarm status, and generate alarm outputs by communicating with the BTC board. Refer to section 3.3 for display operation.

The Front Panel Display includes:

- Liquid Crystal Display.
- 4 * Push buttons (Ack, Reset, Hold and Skip function).
- 4 * LED's (Low Alarm, High Alarm, System Healthy and Watchdog Alarm)

This Display Unit can be installed in either the front door of the TQ4400 Analysing Unit, or, remotely as a wall mounted or console mounted unit. The unit is supplied with plug and socket connections for ease of installation and maintenance.

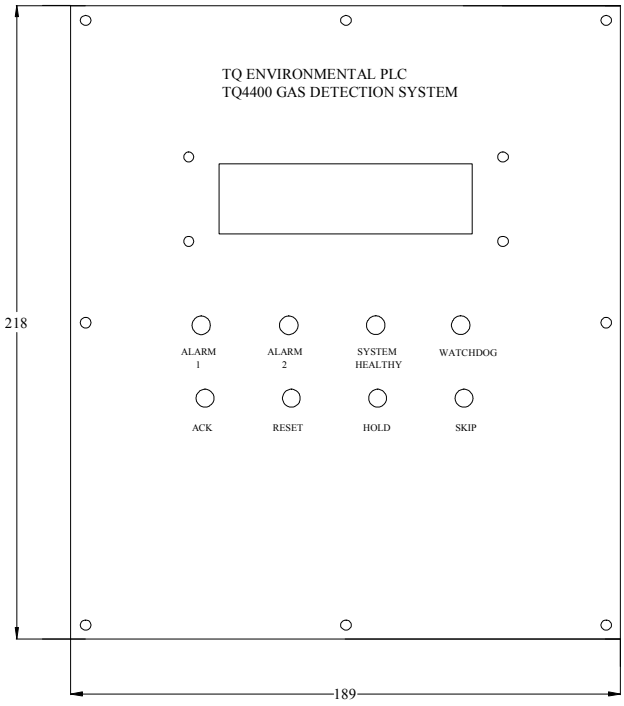


Fig 7 Front Display of TQ4400 Tankscan

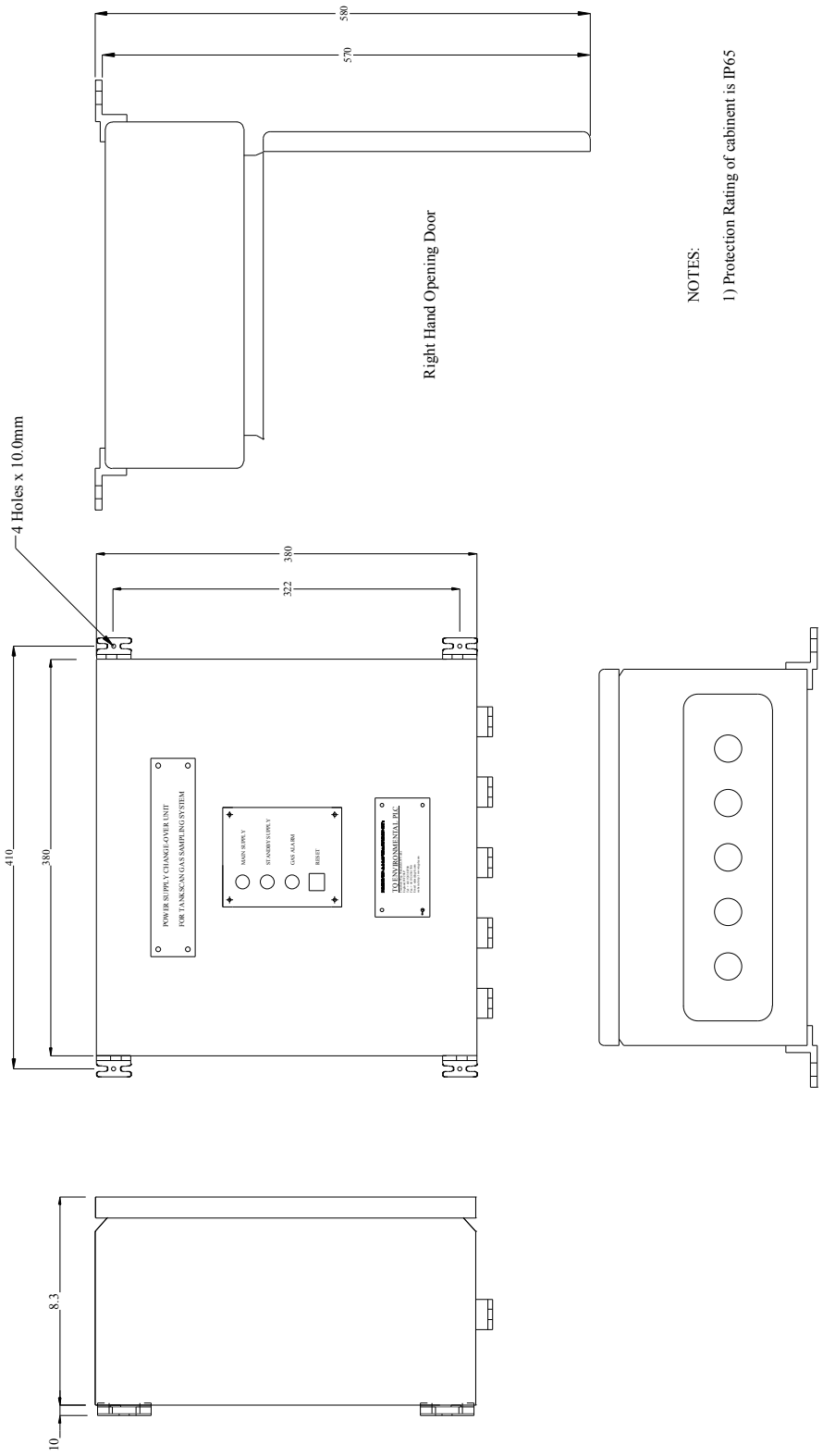


Fig 8 Power Supply Change-over Unit

2.4 Power Supply Change Over Unit

Refer to Fig 8 Page 13.
This Unit is connected to the Ship's 'Main' and 'Emergency' Power Supplies, to provide an automatic changeover for the supply to the Analyser Unit in the event of a 'Mains Supply' failure.

The unit will accept 110 - 240V a.c, 50-60 Hz inputs, and will automatically change back to 'Main' when the main supply is restored.

Incorporated within the Power Supply Change-Over Unit is a TQ126F controller, which monitors the TQ4400 Analysing Unit's 'Leak Detection' gas detector. The TQ126F will disconnect the power supply to the Analyser Unit if the sensor detects a gas concentration of 30% LEL. The power supply to the Analyser Unit will not be restored until the gas concentration has fallen below 30% LEL and the reset button on the front of the Power Supply Change-Over Unit has been pressed.

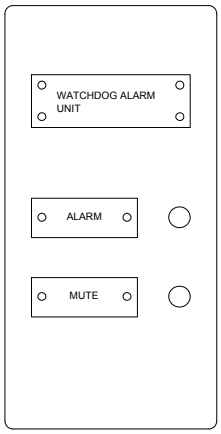
Front Panel indications are provided for:

- Mains Supply On
- Emergency Supply On
- Internal Gas Alarm
-

2.5 Watchdog

This unit is mounted on the rear of the enclosure front door to monitor the main processors in the control board and the display board.

In the event of either of these processors failing the LED and an audible buzzer will activate.



The audible buzzer can be extinguished using the mute button on the unit, but to reset the fault the system has to be restarted by powering down from either the fused isolator in the bottom right hand side of the cabinet or from the power supply changeover unit.

2.6 Outputs.

The TQ4400 standard outputs are in the form of:

- Two sets of Volt Free relay change-over contacts one for High and one for Low Alarms for each sensor
- One set of Volt Free Change-over relay contacts for System Fault Alarm.
- One set of Volt Free Change-over relay contacts for Mains Supply Fail
- One set of Volt Free Change-over relay contacts for Common Concentration Alarm

The Common Alarm relays can be configured to provide a 24V dc output for each alarm level to drive audible/visual warning devices or remote indicators. Relays can also be configured to provide outputs for individual location gas alarms. These additional relay outputs must be specified prior to order placement. Other serial communication techniques such as RS 485 Modbus Protocol will be available shortly. For further information please contact TQ Environmental Plc.

2.7 Technical Specification

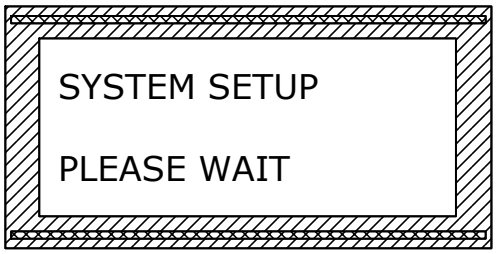
Power	110/240V 50/60Hz @ 4 Amps non inductive
Internal d.c power supplies	1 x 5V DC (System Electronics) 1 x 24V DC (Sensors / Solenoids) (factory fitted dependent on sensor ratings and overall system requirement)
Max no. of locations for sequential monitoring per Max no. of Sensor	48 Locations for 1-3 Sensors 36 Locations for 4 Sensors
Sensor types	4-20mA current sources (2 or 3 wire)
Pump Capacity	36 Litres / Minute (open ended)
Gas Concentration Alarm Outputs	**Standard**: - 2 x Common Low / Common High Volt Free Contacts, @ 5Amps. Resistive. **Custom**: - Up to 1 Individual Volt Free Contact per Sample Location Gas Alarm, 5A
Sample Lines	Seamless Stainless Steel 316. (Preferred) OD 6mm - 8mm, ID 4mm - 6mm. Max length 300Metre @ 4.0mm I/D
Fault Alarm Outputs	1 x Mains Fail Volt Free Contact 1 x System Fault Volt Free Contact 1 x Common Alarm Volt Free Contact
Data communications	RS 485 MODBUS on request
Operational temperature and humidity	0^{o}C-40^{o}C 0-90%RH non-condensing.

3.0 OPERATION

This section explains in detail the TQ4400 system operation and typical alarm conditions. Four front panel push buttons are used for operator interface namely: *SKIP, HOLD, ACK,* and *RESET.*

3.1 System Start-up

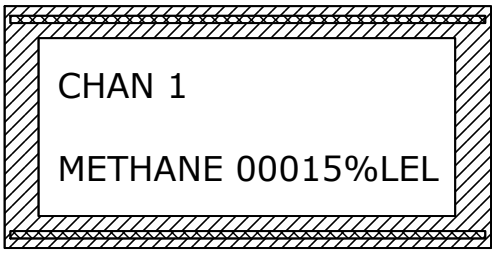
When power is applied to the system, the display will indicate *System Set-up* mode, as below



The system will stay in this mode for approximately 150 seconds.

3.2 Normal Operation

After the 'start-up' delay the system will enter the normal operating mode.



WARNING: On 'Power Up' the Infrared Sensor takes up to two minutes to reach operating temperature, and will initiate a Sensor Fault. This can be cleared after the warm up period by pressing the *RESET* button. Ensure the 'System Healthy' LED is illuminated after pressing the *RESET* button.

The top line of the display shows the channel location and the bottom line of the display will show the gas sensor name, concentration of the gas, and the units of the gas being analysed. The system will sequentially sample all of the channel locations, displaying the appropriate data on the LCD.

3.3 Panel Controls

At any time during the normal operating mode, the user has the option to GOTO, Hold or Skip a channel. These functions are invoked by pressing down the relevant push button, and are discussed further below:

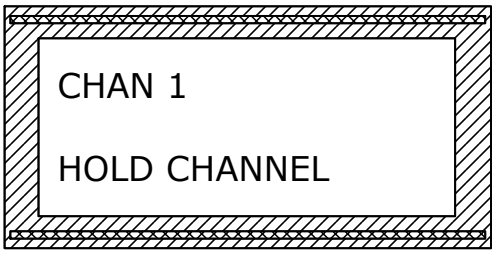
3.3.1 GOTO Channel

The user may press down and hold the *RESET* and *HOLD* button until the display reads *GOTO*, the user must then release the *RESET* and *HOLD* button. You can then select which sample location to 'GOTO' by using *ACK* to go up and *RESET* to go down through the sample locations. Pressing *Hold* selects the desired channel.

Once the unit is sampling from the desired location you can then either HOLD, SKIP or Reverse Purge the location.

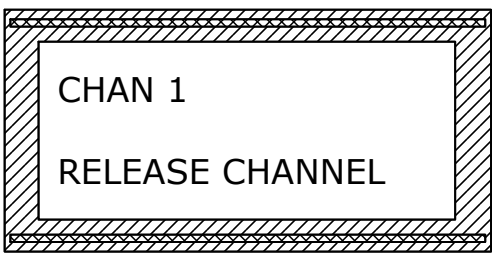
3.3.2 Hold Channel

The user may press down and hold the *HOLD* button until the display reads *HOLD CHANNEL*, the user must then release the *HOLD* button.



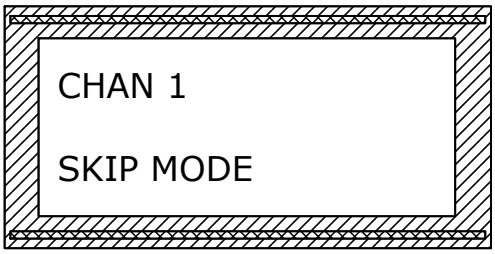
This will invoke the Hold Channel function. The current Channel location will be continuously sampled for a maximum period of 20 minutes after which time the system will revert to sequential sampling. At any time the user may release the channel and enable the system to revert back to sequential sampling.

This is achieved by pressing down and holding the *HOLD* button until the display reads *RELEASE CHANNEL*, the user must then release the *HOLD* button.

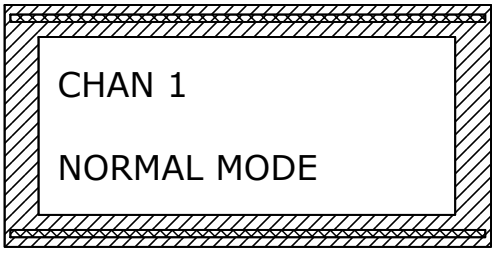


3.3.3 Skip Channel

The user may press down and hold the *SKIP* button until the display reads *SKIP MODE*, the user must then release the *SKIP* button.



This will invoke the Skip Channel function. The current channel location will be skipped when the system is sequentially sampling the channel locations. When the system returns to the skipped channel, the LCD will display *SKIP MODE* for 5 seconds and then proceed to the next sequential channel. When the LCD displays *SKIP MODE* the user may revoke the skip command by pressing down and holding the *SKIP* button until the display reads *NORMAL MODE*, the user must then release the *SKIP* button.



3.3.4 Manual Global Reverse Purge.

The user may press down and hold the *ACK* and *RESET* buttons until the display reads *GLOBAL REVERSE PURGE* followed by *REVERSE PURGE*. This initiates a global reverse purge where air is blown down every sample line for a set period of time. The purge duration is factory set and a 'Button box' is required to be interfaced to the controller BTC board to change the value.

After the system has finished purging it will revert back to sampling.

3.3.5 Manual Individual Reverse Purge.

In order to reverse purge an individual sample location you initially have to GOTO the desired location, refer to section 3.3.1.
Once the system is sampling from the required location you can then purge the sample line by pressing and holding the *ACK* and *HOLD* button until

the display reads *REVERSE PURGE*. This will purge the line for the set duration, once completed revert back to sampling.

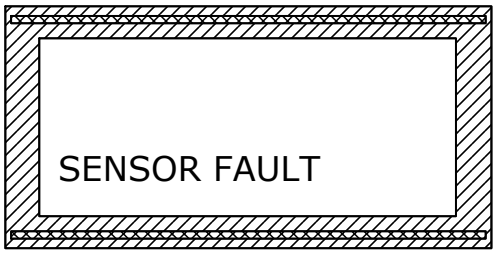
3.3.6 Automatic Global Reverse Purge.

This is a reverse purge, for all sample points, which automatically initiates after a set number of complete cycles of sample points. We recommend this function to be enabled for an analyser unit which draws samples from points where water can be found, such as ballast tanks. The purge frequency is factory set and can only be altered using a 'button box' being interfaced with the controller BTC board. The box can be obtained by contacting TQ.

3.4 Alarm Conditions

3.4.1 Fault Conditions

There are three possible fault conditions: *Sensor Fault*, *Flow Fail and Comms Failure*. The sensor will be in fault if the output of the sensor falls below a set value. When this occurs the LCD will display *SENSOR FAULT,* the System Healthy LED will extinguish and the Fault relay will be activated.



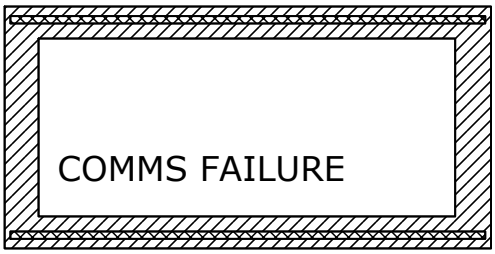
The Flow Fail will occur if the pressure through the system drops to a set value. When this occurs the LCD will display *FLOW FAIL,* the System Healthy led will extinguish and the Fault relay will be activated.



To clear the Fault condition press and hold the *RESET* button until the display reads *RESET ALARM*. At the same time, the System Healthy led will illuminate and the Fault relay will be de-activated.



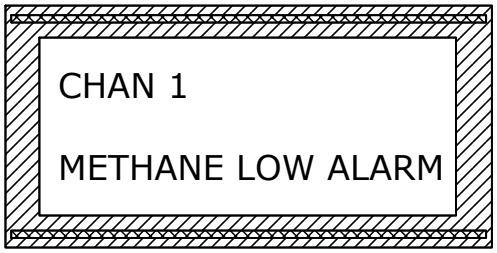
A Comms Failure will initiate when communications are interrupted for more than 2 minutes between the Display BTC PCB and the Control BTC PCB.

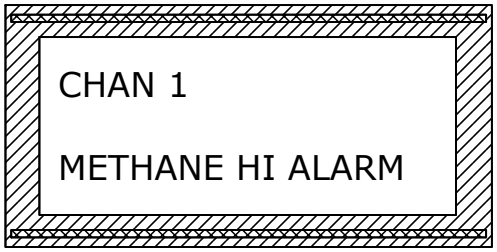


This cannot be reset by the *RESET* button; the panel has to be opened and powered down and back up again. However it is preferred to do this from the power supply changeover unit.

3.4.2 Concentration Alarms

There are two alarms on the system, a low level alarm, *ALARM 1*, and a high level alarm, *ALARM 2*. When the gas concentration exceeds the set levels, the appropriate alarms will be activated, and operate the appropriate LED's and alarm relays. The LCD will display the first channel to be in alarm, together with the sensor gas type and relevant alarm condition. The system will continue to sample the channels sequentially.

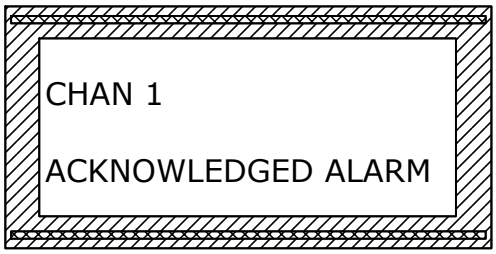




SYSTEM
HEALTHY

The user may reset the alarmed channel by pressing the *RESET* button. At which point the alarms for that channel will be cleared. If there are any pending alarms then the LCD will display the next alarmed channel information. The user must again press the *RESET* button to clear that particular alarm. When no more alarms are present, the system will display the concentration as normal.

The user may press the *Ack* button to clear the audible buzzer. This will acknowledge the alarmed channel and display *ALARM ACKNOWLEDGED* on the LCD.



If there is a pending alarm the LCD will display the pending alarm information. When all alarmed channels have been acknowledged, the system will display the gas concentration sequentially, but will also display *ALARM ACKNOWLEDGED* on the LCD for 5 seconds. To de-activate the alarm relays the user must use the *RESET* function as described above.



Each alarm is then reset on a channel per channel basis, i.e. if a particular channel is in alarm then another channel comes into alarm, then the first channel requires one reset and a second reset clears the next set of alarms in the second channel.

3.5 Time and Date.

If a printer is included at time of supply, to record concentration values. The time and date can be set using the 4 x push button function keys on the front panel. The instructions are included on an additional functions plaque, mounted adjacent to the display. If no printer is included with the equipment, the time and date functions are disabled as there is no means of displaying the information.

4.0 INSTALLATION

Installation guidance is not included in this web version of the operation manual. Please contact TQ environmental for the complete Operating manual if installation notes are required.

5.0 COMMISSIONING

Commissioning guidance is not included in this web version of the operation manual. Please contact TQ environmental for the complete Operating manual if Commissioning notes are required.

6.0 SCHEDULED MAINTENANCE

6.1 System Confidence Test Sequential Sampling Part

Frequency: 6 Months

Equipment Needed: Calibration Gas suitable for the sequential sensors i.e. it is recommended that gas of 50% LEL (or similar) is used when a 0-100% LEL sensor is installed.

Ensure that the concentration of gas used is greater than that of the highest alarm set point.

Description:

When sample locations are grouped into zones, and different zones activate different alarms, ensure that all 'zone alarm configurations' are known so that alarms can be checked.

Activate a flow fail alarm, this can be achieved by blocking the current sample line through the ball stop valve. Once the alarm is activated, acknowledge the alarm, refer to section 3.4.

Connect the test gas to the calibration point within the analysing unit but do not turn the gas on. Ensure that the 3-Way valve is set on the 'calibration' position and turn the gas on at a rate of 1 litre / minute.

The system will now generate a gas alarm on the current sample location. Ensure all relevant alarms are activated, for example any external beacons and alarms on the Vessels alarm management system.

Ensure also that the display reads the same concentration as that of the calibration gas used, i.e. 50% LEL if 50% LEL calibration gas is used.

It must be noted however that all calibration gases have a tolerance that must be taken in to account.

Repeat for all locations that activate different alarms.

6.2 Filter Check

Frequency: 6 Months / when required

Equipment Needed: Replacement Filter Elements

Description: Check that all Coalescing; Particulate; End of Line; In-Line and Snorkel Valves are in good condition and clean/ replace if necessary.

6.3 System Calibration (All Sensors)

Frequency: 12 months

Equipment Needed: Calibration Gas suitable for the sensors being calibrated i.e.: use 50% LEL gas (or similar) for a 0-100% LEL sensor.

Description: Refer to section 6.1 for applying test gas. Repeat for all Sensors.
Note, if the calibration for any of the sensors requires altering, a 'button box' and instructions is required from TQ.

6.4 Pump Service

Frequency: 24 months

Equipment Needed: Pump Service Kit

Description: Replace the pump diaphragms and valve springs.

6.5 Inspecting and Cleaning Snorkel Valves

Frequency: Whenever Ballast Tanks are inspected

Equipment Needed: High Pressure Water Supply

Description:

a) Power down the TQ4400 gas detection equipment. Visually inspect end of line snorkel valves for dirt and silt build up. Hose down and clean the valve as necessary.

b) Inspect Snorkel Valve for any physical damage, repair or replace as necessary. Isolate the line as follows. Inhibit a sample line as per Section 3.3.3 and replace as soon as possible with Part No. 302-001. After Replacement re-instate that line as per Section 3.3.3.

c) Allow to dry and power up the TQ4400 unit.

6.6 Testing and Calibrating the TQ126F

Frequency: 12 months

Equipment Needed: Zero and Span Calibration Gas suitable for the sensor used.
Span: 50% LEL or similar
Zero: Synthetic Air 0% LEL

Description:

Please refer to section 2.1.3 for an introduction to the TQ126F, and the drawing showing the TQ 126F PCB Layout, Fig 14.

Ensure the correct voltage is across the gas sensor by measuring the voltage across terminals 1 and 3 of the 'PEL' terminal connector, next to VR2, within the sensor's junction box. Adjust VR1 so the voltage is 2.00V d.c, +/- 0.1v.

Apply Zero gas to the sensor using a suitable gassing cap at a rate of 1 litre/minute, adjust VR2 so that the TQ126F display reads 0.00 %.

Apply Span gas to the sensor using the suitable gassing cap at a rate of 1 litre/minute; adjust VRoVM so that the TQ 126F display reads the same value as the span gas, i.e. 50.00 %.

While applying gas to the sensor and ensure that the power to the Analysing Unit is cut at 30 % LEL.

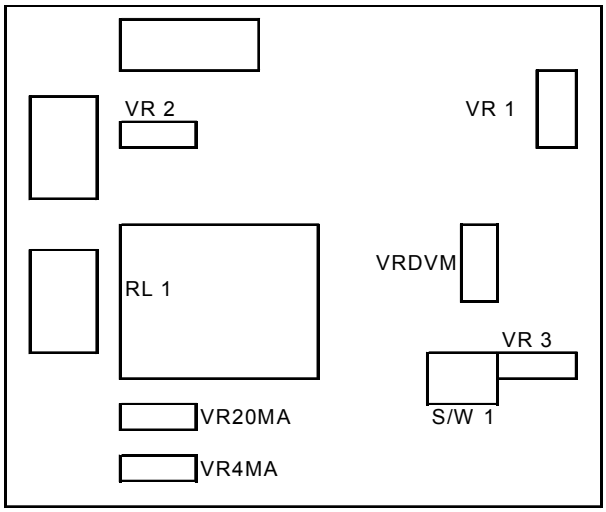


Fig.14 RBP 126F PCB Layout Drawing