Multi-Point Sample Draw
Gas Transmitter

VA SQN 8X

User Manual

Vulcain
Division of BW Technologies

Protecting your health and your environment.

WARRANTY AND LIMITS OF LIABILITY

Vulcain Inc. warrants to the original purchaser that its product, and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase. Vulcain will, without any charge and at its option, repair or replace defective products or components upon their delivery to its Repair and Service Department. This warranty does not apply in the event of misuse or abuse of the product, or as a result of unauthorized alterations or repairs. Vulcain shall not be liable for any consequential damages, including, without limitation, damages resulting from loss of use.

Every precaution for accuracy has been taken in the preparation of this manual. However, Vulcain neither assumes responsibility for any omissions or errors that may appear, nor liability for any damages that may result from the use of the products in accordance with the information contained in this manual.

To obtain warranty service, return the product, along with a complete description of the defect, transportation prepaid. Vulcain assumes no risk for damage in transit. Following warranty repair, the product will be returned to the buyer, transportation prepaid.

4005 Matte Boulevard, Unit G
Brossard, Quebec
Canada J4Y 2P4
Technical Support Line:
1-800-563-2967

Before returning a product for warranty service, please contact Vulcain's Technical Support Department.

- -

Warranty Registration

To validate the warranty, this registration form must be completed in full and sent to Vulcain within 90 days of the date of purchase. Fax it to Vulcain at 1 888 967-9938.

Customer's name: _____

Address: _____

City: _____ State/Province: _____

Location of the installation: _____

Serial No.: _____

BEFORE RETURNING ANY INSTRUMENTS, PLEASE CONTACT US TO OBTAIN A RETURN OF MATERIAL AUTHORIZATION NUMBER.

TABLE OF CONTENTS OF VASQN8X

1. INTRODUCTION

1.1 SPECIFICATIONS

Sensing Technology:	Refrigerant (infrared)
	Electrochemical (toxic)
	Catalytic Combustion (combustibles)
	Diffusion Fuel Cell (oxygen)

Visual Indicators:	Normal operation:	Green LED
	Alarm Level 1:	Red LED
	Alarm Level 2:	Red LED
	Failure:	Yellow LED
	Active Sample Points:	Green LED

Required Power :	24 Vac, 0.74 A
Audible Alarm:	110 dBA at 3 ft. (1 meter)
Number of Sampling Points:	up to 8 (2, 4, or 8)
Outputs:	3 DPDT relays
	(3 alarm levels or 2 alarm levels and fault)
	RS-485
Relay Output Rating:	5A, 30 Vdc or 250 Vac (resistive load)
Alarm Levels:	3
Maximum Sampling Distance:	1000 ft. (305 meters)
Operating Humidity Range:	15% - 90% RH, Non-Condensing
	0% - 99% RH, Non-Condensing (infrared)
Operating Temperature Range:	32°F to 100°F (0°C to 40°C)
Dimensions :	19 po x 13 po x 3.75 po (48 cm 33 cm 10 cm)
Poids :	26,5 lbs (12.02 kg)

1.2 DESCRIPTION

VASQN8X multi-sampling gas transmitters provide detection for a wide range of refrigerant gases and other toxic or explosive gases. A premium quality diaphragm pump ensures ambient air sampling up to a distance of 1000 ft. (305 meters). A sequencer synchronizes the electronic and mechanical architecture to adequately measure the presence of gas in each of the 8 available sensor ports.

1.3 UNPACKING

After opening the package, remove the equipment and components. Please make sure that all the items described on the order form or packing slip **are actually in the box and are undamaged.**

2. INSTALLATION INSTRUCTIONS

2.1 INSTALLATION INSTRUCTIONS

Installation instructions must be **strictly** followed to ensure the proper functioning of the equipment. Vulcain will not be liable or responsible for any malfunctions or incidents that may occur from improper installation.

- Place each unit in a location that is easily accessible for service.

- Avoid placing units near sources of vibrations.

- Avoid placing units near equipment that emits electromagnetic interference.

- Avoid any location where there are large temperature swings.

- Before installing, verify all local codes, standards or legislation that could impact choice of installation location.

2.2 WALL MOUNT INSTALLATION DETAILS

Affix the VASQN8X transmitter to the wall at a height of 5 ft. (1.5 meters) from the floor. Affix all sensors at an appropriate height and location, as shown in table 1. Place the sensors in a perimeter around a heat sink, a boiler or all other equipment that should be monitored.

Table 1 - Recommended Wall Mount Installation Height

Detected Gas		Relative Density (air = 1)	Installation Height
CO	Carbon Monoxide	0.968	3 - 5 ft. (1 - 1.5 m) from floor
NO$_2$	Nitrogen Dioxide	1.58 (cold)	*1 - 3 ft. (30 cm to 1 m) from ceiling
O$_2$	Oxygen	1.43	3 - 5 ft. (1 - 1.5 m) from floor
R11		5.04	
R12		4.20	
R22	Refrigerants	3.11	1 ft. (30 cm) from floor
R123		5.27	
R125		4.14	
R134A		3.52	
COMB	Most combustibles are heavier than air, with the exception of methane, hydrogen,ethylene and acetylene. For gases that are heavier than air, sensors should be installed approximately 30 cm (1 ft.) from the floor. For combustibles that are lighter than air, sensors should be installed 30 cm (1 ft.) from the ceiling, close to the potential leak source.		

* May differ for certain uses. For example, heated NO2 gas coming from an exhaust system is lighter than 1.58.

2.2 WALL MOUNT INSTALLATION DETAILS (CONTINUED)

Install the tubing between the monitor and the sensors. Connect the tubing to each of the push-in connectors of both the transmitter intake (suction) and sensors. Also connect one length of tubing to the air exhaust, up to a secure area.

Mounting hole

User Interface

Incoming gas holes

Wiring Hole

Lock

Piezo

4 Holes ⌀3/8

Air Output

Dimensions in inches
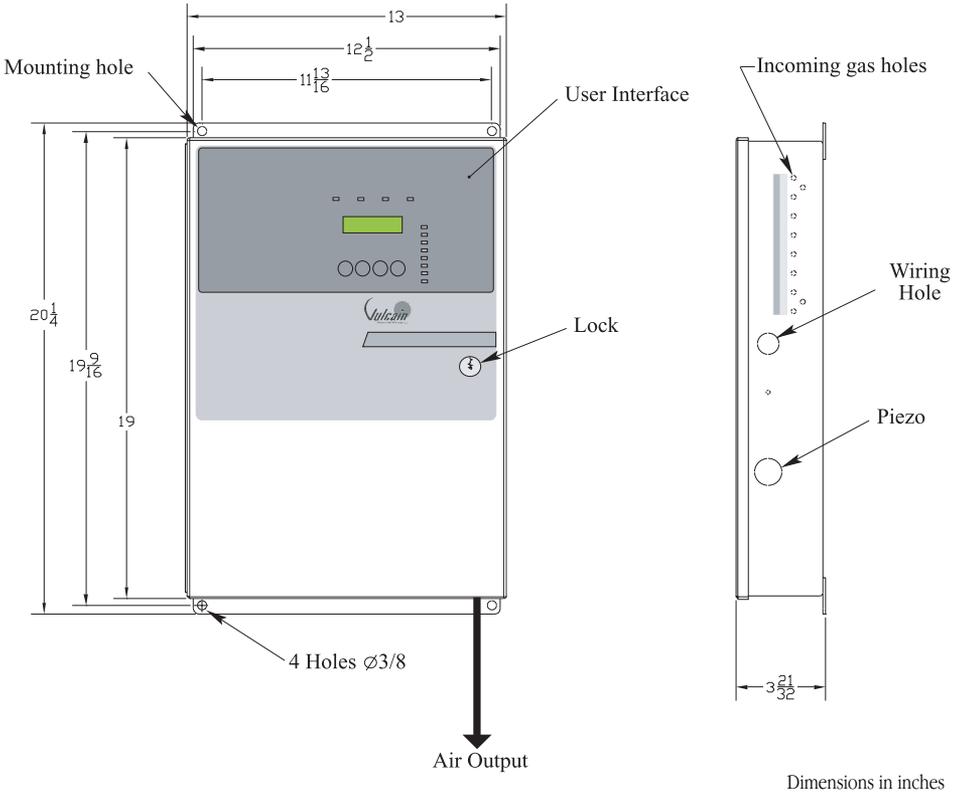
WARNING
Avoid bending the tubing as this may cause damage.

2.3 DETERMINING THE NUMBER OF SAMPLING POINTS

The monitoring radius of each type of sampling points determines the area covered by the unit.

Table 2 - Area coverded

Detected Gas		Radius of Surveillance	Area Covered
CO	Carbon Monoxide	50 ft. (15 m)	7,854 ft.^{2} (707 m^2)
NO$_2$	Nitrogen Dioxide		
Others		23 ft. (7 m)	1,257 ft.^{2} (154 m^2)

2.4 INSTALLING SAMPLING POINTS

Sampling points are equipped with a case to deflect particles that could obstruct air circulation within the system. This spacing of the tubing is important to maintaining proper air flow and to prevent premature equipment deterioration.

Tubing adapter (to VASQN8X)

Enclosure

$\frac{9}{16}$

ø$\frac{1}{4}$

Mounting Hole

4

Air Inlet

DIMENSIONS IN INCHES

3$\frac{1}{2}$

4

4$\frac{9}{16}$

3. WIRING DETAILS

Opening the VASQN8X monitor provides access to the terminal boards. Connect the 24 Vac power supply to the power supply terminal. The power supply should come directly from the electrical panel on a dedicated circuit. Connect the auxiliary device to the relay outputs. Relay 1 is activated, by default, when gas concentrations reach alarm level A. Relay 2 is activated when gas concentrations reach alarm level B and relay 3 signals a failure (breakdown). The functioning sequence is completely programmable, thus programming can be modified if it was requested at the time of order.

POWER (J9)

COMMUNICATION (J9)
Communication wiring gauge
#24 AWG (BELDEN 9841)
Twisted and shielded cables (pair)
2000 ft. (600 m) per channel
T-tap: 60 ft. (20 m)
130 ft. (40 m) total

PCB DETAILS

POWER SWITCH

PCBVASQN8XR9
Made in Canada
508375

End of line jumper

JUMPER (J5)
Activate/deactivate
Audible alarm

3 RELAY OUTPUTS : (J50-J11-J12)
Relay 1: J50
Relay 2: J11
Relay 3: J12
5A, 30 Vdc ou 250 Vac
(resistive load)

5A, 30Vdc or 250 Vac
(resistive load)

Normally open	3+5	4+6
Normally close	1+3	2+4

SENSOR 1
SENSOR 2

GREEN
WHITE
BLACK
RED

FACTORY SET
WIRING
CONNECTION

A dedicated circuit must be used for power supply

4. PROGRAMMING

4.1 USER INTERFACE

As indicated by the green LED for each port, each of the ports (up to 8) is analyzed following a specific time interval based on the type of probe used and the length and course of the sensor tubing. When the gas concentration is channeled and measured at the transmitter, the value is stored until the next reading.

Visual Indicators:
I/0 Normal Operation: Green LED
Alarm Level A: First Red LED
Alarm Level B: Second Red LED
Alarm Level C: Both Red LEDs blink
Failure: Yellow LED
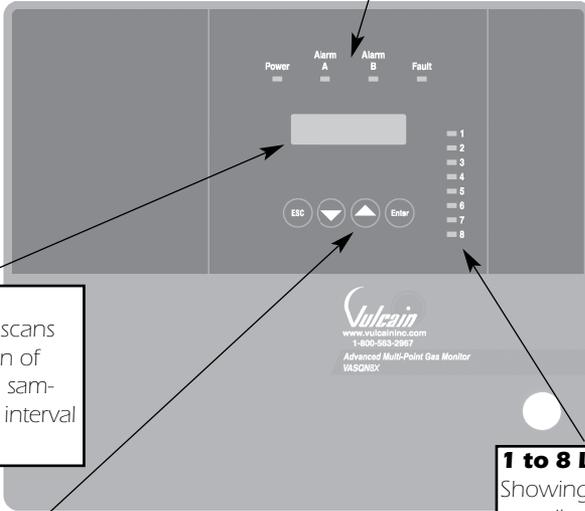
LCD Display:
The LCD display scans the concentration of gas read in each sampling zone at an interval of 2 seconds.

1 to 8 LEDs
Showing operating sampling point.

Programming Keys:
Esc: Exit a Menu
ENTER: Access the programming or acknowledge a programming field or value Up and **Down Arrow Keys:** Select a programming field or value Scan the reading at a specific sampling zone.

4.2 DETECTION RANGE AND ALARM LEVELS

Table 3
Range and Alarm Levels

Gas Detected		Range	Alarm A	Alarm B	AlarmC
CO	Carbon Monoxide	0 - 255 PPM	25 PPM	200 PPM	225 PPM
NO$_2$	Nitrogen Dioxide	0 - 10.2 PPM	0.72 PPM	2 PPM	9 PPM
O$_2$	Oxygen	0 - 25.5% Vol.	19.5% Vol.	22% Vol.	22.5% Vol.
R-123	Refrigerant	0 - 1,020 PPM	50 PPM	500 PPM	900 PPM
R-11					
R-12					
R-22	Refrigerant Q1	0 - 1,020 PPM	250 PPM	500 PPM	900 PPM
R-125					
R134A					
COMB	Combustibles	0 - 102% LEL	25% LEL	50% LEL	90% LEL

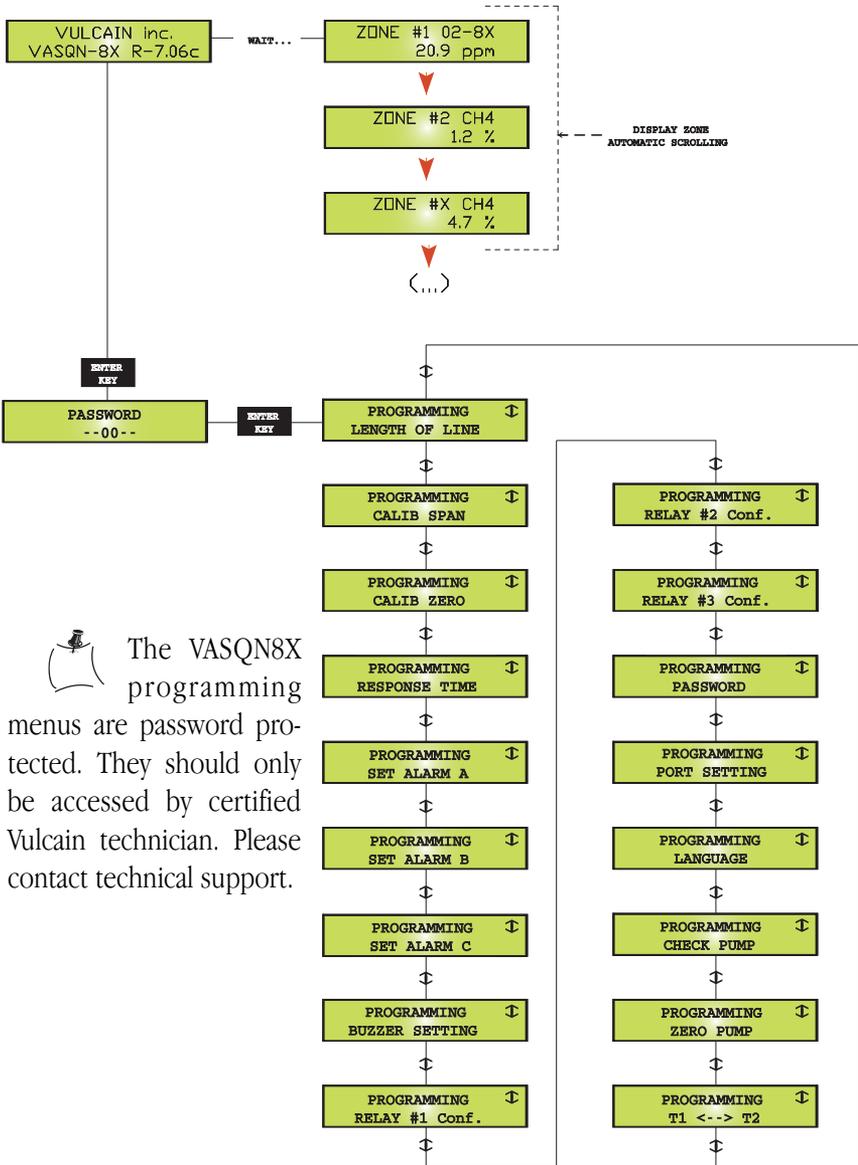A different alarm level setting can be programmed to meet the constraints of a particular use.

Note that is a given zone is in alarm state, the system will display the status of that zone intermittently between the displays of the other zones monitored by the system. For example, if Zone 2 is in alarm status, the system will display the zones in the following order: *Zone 1*; **Zone 2**; *Zone 3*; **Zone 2** etc.

4.3 PROGRAMMING MENUS

Different programming menus allow users to configure VASQN8X according to their needs. In normal mode, the screen displays the system status by scrolling gas concentrations in the different zones. Access to programming is password protected. Here is an overview of the various menus:

VULCAIN inc. **VASQN-8X R-7.06c**	WAIT... → **ZONE #1 02-8X** **20.9 ppm**

↓

ZONE #2 CH4
1.2 %

- - - **DISPLAY ZONE AUTOMATIC SCROLLING**

↓

ZONE #X CH4
4.7 %

↓

(...)

ENTER KEY

PASSWORD **--00--**	**ENTER KEY**	**PROGRAMMING** ↕ **LENGTH OF LINE**

PROGRAMMING ↕ **CALIB SPAN**	**PROGRAMMING** ↕ **RELAY #2 Conf.**
PROGRAMMING ↕ **CALIB ZERO**	**PROGRAMMING** ↕ **RELAY #3 Conf.**
PROGRAMMING ↕ **RESPONSE TIME**	**PROGRAMMING** ↕ **PASSWORD**
PROGRAMMING ↕ **SET ALARM A**	**PROGRAMMING** ↕ **PORT SETTING**
PROGRAMMING ↕ **SET ALARM B**	**PROGRAMMING** ↕ **LANGUAGE**
PROGRAMMING ↕ **SET ALARM C**	**PROGRAMMING** ↕ **CHECK PUMP**
PROGRAMMING ↕ **BUZZER SETTING**	**PROGRAMMING** ↕ **ZERO PUMP**
PROGRAMMING ↕ **RELAY #1 Conf.**	**PROGRAMMING** ↕ **T1 <--> T2**

The VASQN8X programming menus are password protected. They should only be accessed by certified Vulcain technician. Please contact technical support.

4.3 PROGRAMMING MENUS (CONTINUED)

The menus allow you to configure the system to optimize monitoring of the space to safeguard. The following pages describe the different menus.

Programmation Menus Description

```
PROGRAMMING  ⌬
LENGTH OF LINE
```

This menu allows the user to configure the length of sensor tubing. This field will allow the unit to calculate sensor delays. Therefore, the greater the distance between the VASQN8X and the sensor points, the more important it is to calculate sensor delays, which will allow a more representative reading of the gases in an area being monitored. See the table at the end of the setup menus description section.

```
PROGRAMMING  ⌬
 CALIB SPAN
```

CALIB SPAN allows the user to input a reference detection value. This value is the basis on which the unit will calculate gas concentrations in the environment.

```
PROGRAMMING  ⌬
 CALIB ZERO
```

CALIB ZERO allows the user to define the zero of the unit.

```
PROGRAMMING  ⌬
RESPONSE TIME
```

Response time is a delay configured by the user. It holds up the zones scrolling to adapt the sensors with their detection time.

```
PROGRAMMING  ⌬     PROGRAMMING  ⌬     PROGRAMMING  ⌬
SET ALARM A        SET ALARM B        SET ALARM C
```

This field lets you set different alarm levels for different gas concentrations (see detection range et alarm level table). In accordance with the relay configuration, different actions will be taken by the relays, according to the user's needs. In the case of an alarm, the affected sensor will be displayed on screen.

```
PROGRAMMING  ⌬     PROGRAMMING  ⌬     PROGRAMMING  ⌬     PROGRAMMING  ⌬
BUZZER SETTING     RELAY #1 Conf.     RELAY #2 Conf.     RELAY #3 Conf.
```

This feature links system status to setting on the relays and audible alarm. Here are the system status that could set on an action.

  1- Alarm A (Gas concentration has reached alarm level A)
  2- Alarm B (Gas concentration has reached alarm level B)
  3- Alarm C (Gas concentration has reached alarm level C)
  4- Fault (A system anomaly has been detected)
  5- Alarm A^B (A or B: The relay will be set off if the gas concentration reaches alarm A or B)
  6- Fault +P (The relay will be set off in the event of communication failure or pump failure)
  7- --- (No system status will set off the relay)

```
PROGRAMMING  ⌬
 PASSWORD
```

Allows the user to modify the password to access setup menus.

```
PROGRAMMING  ⬍
 PORT SETTING
```

The different ports bring the air samples to the system and trigged the related actions. It is possible to set an action for each of the 8 ports. Here is an exemple:

```
PROGRAMMING
P  R  T1  A  T2  B⬍
```

PORT #1 **-** RELAY #1 **-** TRANSMITTER #1, ALARM A **-** TRANSMITTER #2, ALARM B
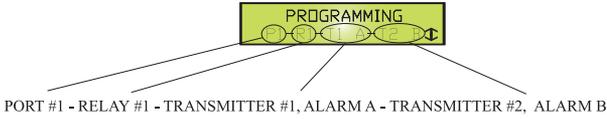
```
PROGRAMMING  ⬍
  LANGUAGE
```

This field allows the user to change the programming language: English or French.

```
PROGRAMMING  ⬍
 CHECK PUMP
```
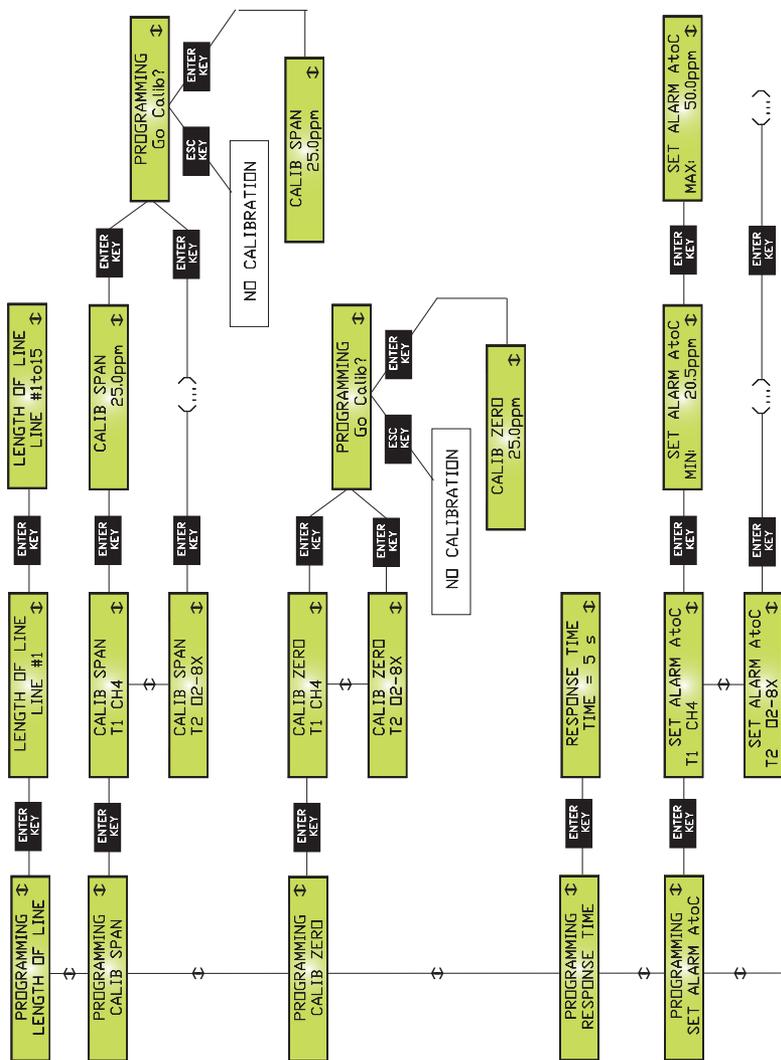
Verify pump operation.

```
PROGRAMMING  ⬍
 ZERO PUMP
```

Calculate zero calibration for the pump.

```
PROGRAMMING  ⬍
 T1  <-->  T2
```
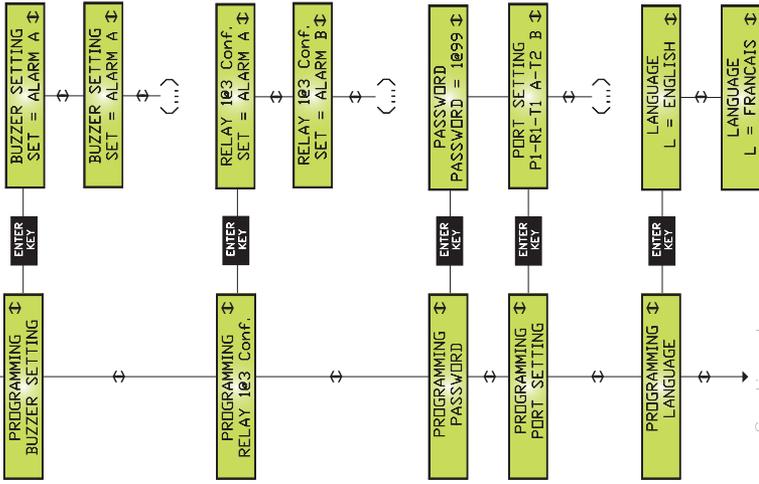
Swap tranmitters. T1 <--> T2

4.3.1 PROGRAMMATION MENUS DETAILS 1/3

```
PROGRAMMING  ↕          LENGTH OF LINE  ↕          LENGTH OF LINE  ↕
LENGTH OF LINE          LINE #1                     LINE #1to15
```
ENTER KEY → ENTER KEY →

```
PROGRAMMING  ↕          CALIB SPAN  ↕               CALIB SPAN  ↕
CALIB SPAN              T1 CH4                      25.0ppm
```
ENTER KEY → ENTER KEY →

```
                        CALIB SPAN  ↕
                        T2 O2-8X
```
ENTER KEY →   (...)

```
PROGRAMMING  ↕             PROGRAMMING  ↕
Go Calib?                  Go Calib?
```
ESC KEY / ENTER KEY

```
NO CALIBRATION
```

```
CALIB SPAN  ↕
25.0ppm
```

```
PROGRAMMING  ↕          CALIB ZERO  ↕              CALIB ZERO  ↕
CALIB ZERO             T1 CH4                      25.0ppm
```
ENTER KEY → ENTER KEY →

```
                        CALIB ZERO  ↕
                        T2 O2-8X
```
ENTER KEY →   (...)

```
PROGRAMMING  ↕             PROGRAMMING  ↕
Go Calib?                  Go Calib?
```
ESC KEY / ENTER KEY

```
NO CALIBRATION
```

```
CALIB ZERO  ↕
25.0ppm
```

```
PROGRAMMING  ↕          RESPONSE TIME  ↕
RESPONSE TIME          TIME = 5 s
```
ENTER KEY →

```
PROGRAMMING  ↕          SET ALARM AtoC  ↕          SET ALARM AtoC  ↕          SET ALARM AtoC  ↕
SET ALARM AtoC         T1 CH4                      MIN: 20.5ppm               MAX: 50.0ppm
```
ENTER KEY → ENTER KEY → ENTER KEY →

```
                        SET ALARM AtoC  ↕
                        T2 O2-8X
```
ENTER KEY →   (...)   (...)

Continued
next page

4.3.1 PROGRAMMATION MENUS DETAILS 2/3

PROGRAMMING BUZZER SETTING → ENTER KEY → BUZZER SETTING SET = ALARM A / BUZZER SETTING SET = ALARM A

PROGRAMMING RELAY 1@3 Conf. → ENTER KEY → RELAY 1@3 Conf. SET = ALARM A / RELAY 1@3 Conf. SET = ALARM B

PROGRAMMING PASSWORD → ENTER KEY → PASSWORD PASSWORD = 1@99

PROGRAMMING PORT SETTING → ENTER KEY → PORT SETTING P1-R1-T1 A-T2 B

PROGRAMMING LANGUAGE → ENTER KEY → LANGUAGE L = ENGLISH / LANGUAGE L = FRANCAIS

4.3.1 PROGRAMMATION MENUS DETAILS 3/3

Previous page

```
PROGRAMMING ↕        ENTER      FLOW PUMP TEST
CHECK PUMP           KEY        FLOW 100 : 0 ↕

PROGRAMMING ↕        ENTER      ZERO PUMP TEST
ZERO PUMP            KEY        Pump OFF ?

PROGRAMMING ↕        ENTER      T1 <--> T2        ENTER      T1 =    O2-8X
T1 <--> T2           KEY           ok ?           KEY        T2 =    CH4
```
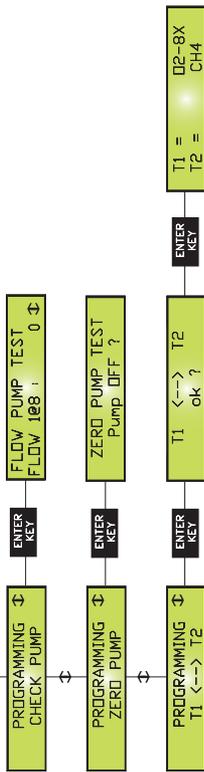
4.5 SENSOR TUBING LENGTHS

Tubing Lengths						
Length (ft.)	Code	Dwell Time (sec)		Length (ft.)	Code	Dwell Time (sec)
No sampling	0	0		301-350	8	160
0-25	1	10		351-400	9	185
26-50	2	20		401-450	10	210
51-100	3	40		451-500	11	260
101-150	4	60		501-600	12	300
151-200	5	95		601-700	13	350
201-250	6	130		701-800	14	400
251-300	7	145		801-100	15	550

5. MAINTENANCE

The VASQN8X requires no maintenance. Transmitters, however, require regular inspection and calibration.

5.1 PERIODIC INSPECTIONS AND CALIBRATIONS

Vulcain supplies its customers with highly specialized gas detection equipment. Beyond the warranty period, these systems require maintenance and calibration on a regular basis (usually twice a year).

These inspections and calibrations can only be performed by qualified technicians either trained or certified by Vulcain. Vulcain is exempt from any responsibility or from lawsuit claiming responsibility resulting from functioning or malfunctioning of the systems for which it does not or no longer performs maintenance and calibration.

An updated list of authorized service centers is available from Technical Services.

When calibration cannot be accurately achieved, the cell must be replaced. Keep a log of all maintenance, calibration and alarms.

5.2 REPLACEMENT PARTS

Because of the continuing evolution of our products, we ask you to contact Technical Support for more information.

5.3 CLEANING

Clean the exterior of the unit with a soft, damp cloth. Do not use solvents, soaps or polishes.