2018

STS Instruments Ltd, Testing & Commissioning Manual

SILOXANE MONITOR MANUAL

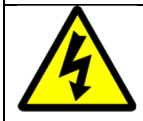
TABLE OF CONTENTS

1.0 MANUAL GUIDE

1.1 DOCUMENT VERSION

Issued by	Author	Issue Date	Revision Number
STS	Jim Ward	18/10/2016	1.0
STS	Jim Ward	20/10/2016	1.1 Final
STS	Jim Ward	26/05/2017	1.2 4-20 Error codes P29
STS	Jim Ward	26/05/2017	1.3 N2 Cylinder Connection
STS	Jim Ward	16/08/2017	1.4 Amended kiosk layout P12, added kiosk gas flow diagrams to appendices P33

1.2 SYMBOLS USED

	Safety Warning	Identifies potential hazards to either the user or the installation.	Failure to follow this information may result in physical injury that in some cases could be fatal, cause irrevocable damage to the instrument or damage to the environment.
	Electrical Hazard	Identifies specific electrical hazards to the user.	Failure to follow this information may result in physical injury that in some cases could be fatal or may cause irrevocable damage to the instrument.

	Notes	Identifies areas where clarification may be required.	

 Should at any point you require additional help or information on the use or installation of the system please contact STS directly at: sales@safetrainingsystems.com or +44 (0) 1344 483563

1.3 SAFETY INFORMATION

 The STS Siloxane Monitor operates from a 110V mains supply, the instrument case should not therefore be opened without having first isolated the power supply and disconnected the kettle lead form the rear of the instrument. The high voltage section of the instrument is protected by clear cover – this should not be removed unless necessary- having followed the above instructions. FAILURE TO ISOLATE THE SUPPLY MAY RESULT IN ELECTRIC SHOCK.

It is the responsibility of the owner of the instrument to complete a risk assessment on its installation, operation and servicing before being commissioned for use.

Inhalation of gases may be harmful to health, it is the responsibility of the operator to ensure they have adequate training in the safety aspects of handling biogas/landfill gas and that they follow appropriate procedures at all times. The vent/exhaust form the instrument must be piped to an area designated safe to discharge to atmosphere- a flame arrestor may be required to be fitted.

Installation and Maintenance of the unit should only be carried out by suitably trained personnel according to the applicable code of practice.

Maintenance should be carried out only using STS approved replacement parts and components – use of substitutes will invalidate the warranty and may be hazardous to both operator and instrument.

No alterations should be made to the instrument or its ancillary components.

Failure to comply with the instructions in this manual could result in injury to the user.

The instrument captures fuel gas any work associated with the instrument must be carried out by a class of person competent and certified to do so.

Should at any point you require additional help or information on the safe installation or use of the system please contact STS immediately at: sales@safetrainingsystems.com or +44 (0) 1344 483563

1.4 ENVIRONMENTAL PARAMETERS

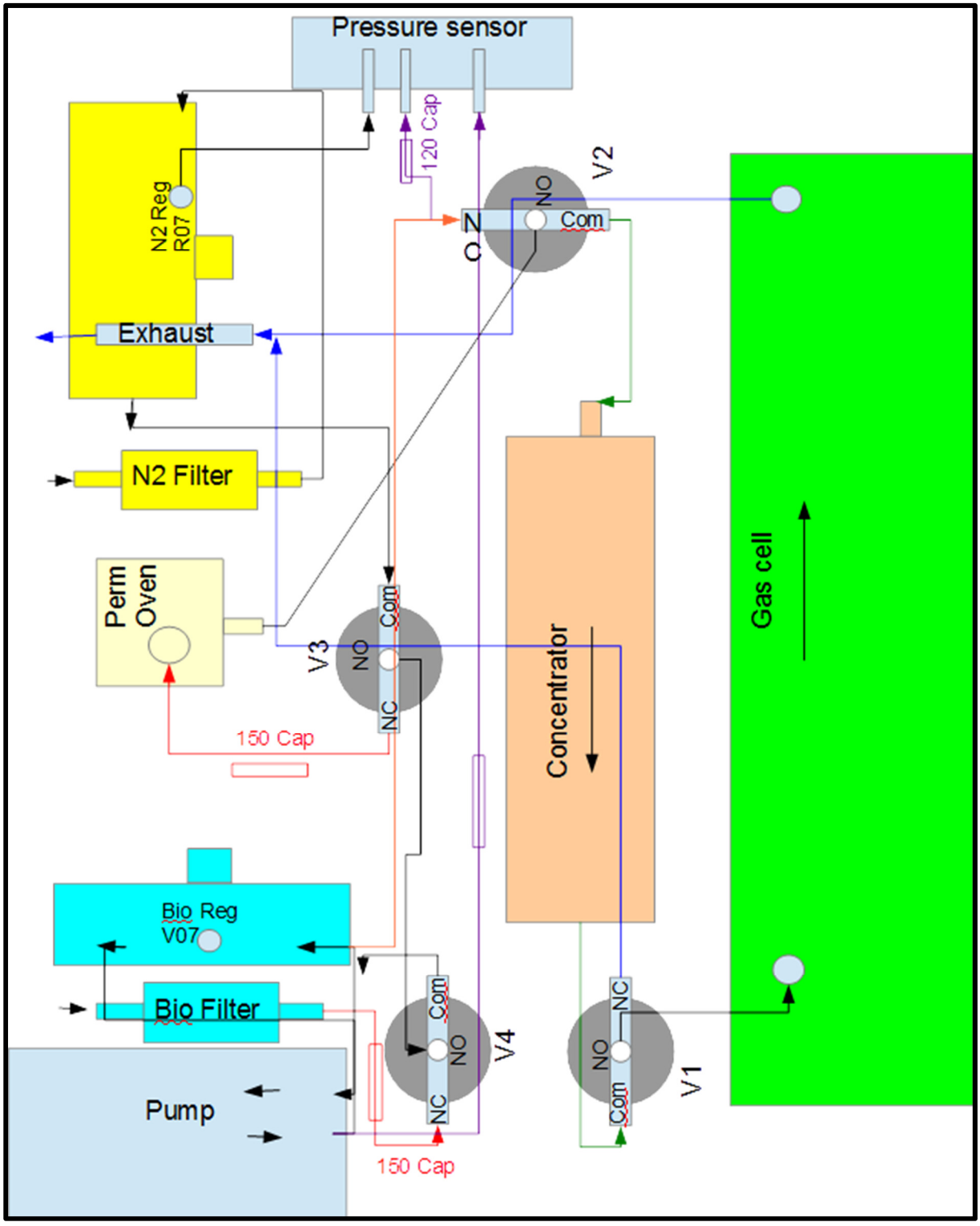
- The Siloxane Monitor is not weatherproof and must be housed in a suitable kiosk or cabinet if sited outside of a building
- If siting inside a building consideration should be given to the local conditions as regards to dust, moisture and ventilation the Monitor is available supplied in a 19" rack case suitable for indoor use with inbuilt thermostatically controlled extraction fans.
- The monitor is suitable for use between 5C and 45C without additional cooling/heating required.
- Gas supply to the instrument should be at a minimum of 200mbar
- Adequate ventilation/air passage around the instrument should be provided.

1.5 INSTRUMENTATION SAFETY SYMBOLS

	Caution
	Electrical Hazard
	Earth Point
	Hot Surface

2.0 OVERVIEW

2.1 INSTRUMENT SCHEMATIC



Biogas is supplied to the instrument via a sampling system that removes water and particulates.

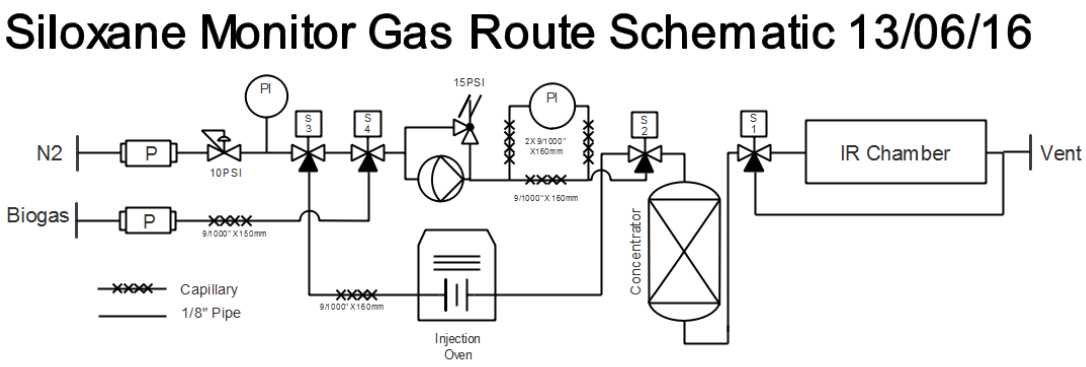
The instrument has been assessed in accordance with IGE SR 25 for potential leakage risk and development of explosive atmospheric conditions internal to the instrument.

The design of the instrument is such that failure of any internal joint inside the instrument cannot give rise to an explosive atmosphere inside the instrument. Nevertheless prior to energising the instrument a pressure drop assessment including the instrument shall be performed. This test shall be performed in accordance with IGE UP1B and include the instrument.

(to 35mb with 1 minute temperature stabilisation followed by a 2 minute tightness test). There shall be no discernible pressure drop over 2 minutes.

If there is a pressure drop then the instrument shall be isolated and the case shall be removed and the internal elements inspected for damage. If the leakage cannot be corrected the instrument shall be removed for factory inspection and correction.

2.2 SAMPLINGS SCHEMATIC



Biogas is sampled by taking samples of raw and or treated biogas from the main gas pipework used to supply the biogas engine.

The sampling arrangement may be single port or multiport, so that the instrument is capable of sampling raw untreated gas, partially treated gas and treated gas prior to combustion in the biogas engine.

The sample lines should be connected into purge points by means of a reducing T and additional isolation valve. The sample points shall be installed so that the purge point on the main gas pipeline remains usable for nitrogen or air purging.

The sample points shall be provided with individual isolation and test points to enable sample line isolation and to enable sample line purging.

Sample pipelines shall be mounted on robust racking.

Sample lines shall be provided with trace heating and lagging from the instrument to the sample point. Electrical power for the trace heating shall be taken from the instrument supply.

The sample line pressure shall be tested and a regulator selected to ensure an instrument sampling system pressure does not exceed 35mb. If the system pressure has been declared by the operator the installer shall nevertheless verify the site system pressure and selected regulator and ensure that compliance with a 35mb inlet pressure is achieved.

The sampling pipework is directed to solenoid valves these are under the control of the instrument which will select the sample it is measuring. The installer shall ensure that each sampling point is directed to the correct solenoid in the sampling system.

Immediately after the solenoid valves the biogas is sent to a pressure regulator. Normally the pressure regulator has been preselected for the site based on operator biogas pressure data. The Installer is required to verify the pressure immediately downstream of the gas pressure regulator.

A water trap device is provided immediately after the regulator, the water trap is provided with an auto drain point. The auto drain is a potential methane release point and must be terminated outside of any enclosed space, and marked with a warning label to indicate that it could release methane.

A coalescing filter is fitted in line after the water trap to remove any remaining moisture from the gas stream, this is a sealed unit with no release point.

After the coalescer some installations are provided with a flame arrester, this is an optional feature selected by some operators. If a flame arrester has been provided the installer should ensure that it does not excessively restrict gas flow during commissioning.

The final treatment stage in the sampling system is a particulate filter(within the instrument), this does not require further checking during installation.

3.0 SAMPLING SYSTEM GAS TESTING

The siloxane instrument has an isolation valve immediately before the instrument, and immediately after the solenoid valves.

The sampling system downstream of the gas regulator shall be tested in accordance with IGE UP1B. (to 35mb with 1 minute temperature stabilisation followed by a 2 minute tightness test). There shall be no discernible pressure drop over 2 minutes.

The sampling pipework shall be tested in accordance with IGE UP 1 Ed 2 except hydrostatic testing shall not be used.

The testing shall be performed without trace heating being energised. For most installations the stabilisation period will be 10 minutes with a strength test duration (STD) of 5 minutes, the maximum % drop will be 20% of the Strength Test Pressure (STP)

With the trace heating energised the installer shall verify the temperature of the sample lines. The minimum temperature for acceptable operation is 60 deg C.

3.1 FEATURES

3.1.1 4-20mA DATA LINE

Provided for the transfer of data to a 3rd party system.

On the rear of the instrument there is an 12-way connector (colour coded Blue) which is for connection of the 4-20mV data lines. The instrument supports up to 4 data parameters.

3.1.2 REMOTE DATA ACCESS

A data service accessible from any internet connection where individual or groups of monitors can be viewed to see current and trend data on a secure website. Email alerts to set alarm thresholds may be configured and data downloaded as CSV files.

Where specified a GSM data communications box is fitted which takes the 4-20mV inputs form the instrument. The system consists of a communications box that houses the GSM transmitter and logging software and a secondary UPS box which will keep reporting after loss of power. Although the instrument will automatically shut down in safe mode should the power fail the telemetry will then be able to alert the operator that the instrument power has failed. The UPS box can be supplied from either 110V or 240V.

 Danger of electrocution – disconnect UPS from mains supply before opening box.

3.1.3 SOLENOID SWITCHING VALVES

Provided to allow a number of different sampling points to be monitored automatically.

The instrument may have up to 3 different sample line feeds. These are brought into the instrument as separate lines to a series of switching solenoid valves. The valves are controlled from the switching schedule on the instrument.

3.1.4 KIOSK ENCLOSURE FAN CONTROL

For temperature control to prevent overheating of the instrument in hot environments.

3.1.5 HEATED LINE

Used where pipework is run outside of buildings to prevent diurnal fluctuation due to condensation of Siloxanes into pipework – typically 110V, 16A.

3.1.6 AUTOMATED WATER TRAP

The automated water trap is designed to remove excess moisture form the gas stream before entering the instrument. The trap should be located such that it is vertically mounted by means of the fixing bracket at the top of the unit. The trap is powered and activated by the Siloxane Monitor via the ancillary control box.

 The automated trap will activate when the internal float rises sufficiently to trigger the solenoid valve to be opened. The fluid is evacuated from the reservoir by the incoming gas pressure until the float returns to the rest position which closes the solenoid.

3.1.7 COALESCING FILTER

The coalescing trap is designed to remove very fine water particles from the gas stream, it should be situated in line between the water trap and the flame arrestor (where fitted). The trap should be secured vertically by means of the fitting at the top of the unit This trap does not drain and should not have any visible water inside. If there is water present, the filter element should be changed immediately and the auto drain trap should also be checked to ensure its correct function.

The Coalescing filter should be changed annually – once replaced ensure that the vessel is pressure tested for leaks before setting the system live.

3.1.8 ANCILLARY CONTROL BOX

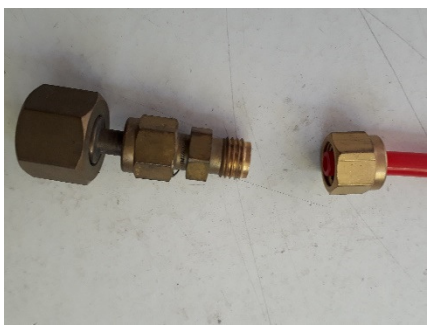
Connector colour coded Red.

- Sample line switching to solenoids
- 24V supply to Water trap
- Exterior cabinet fan supply

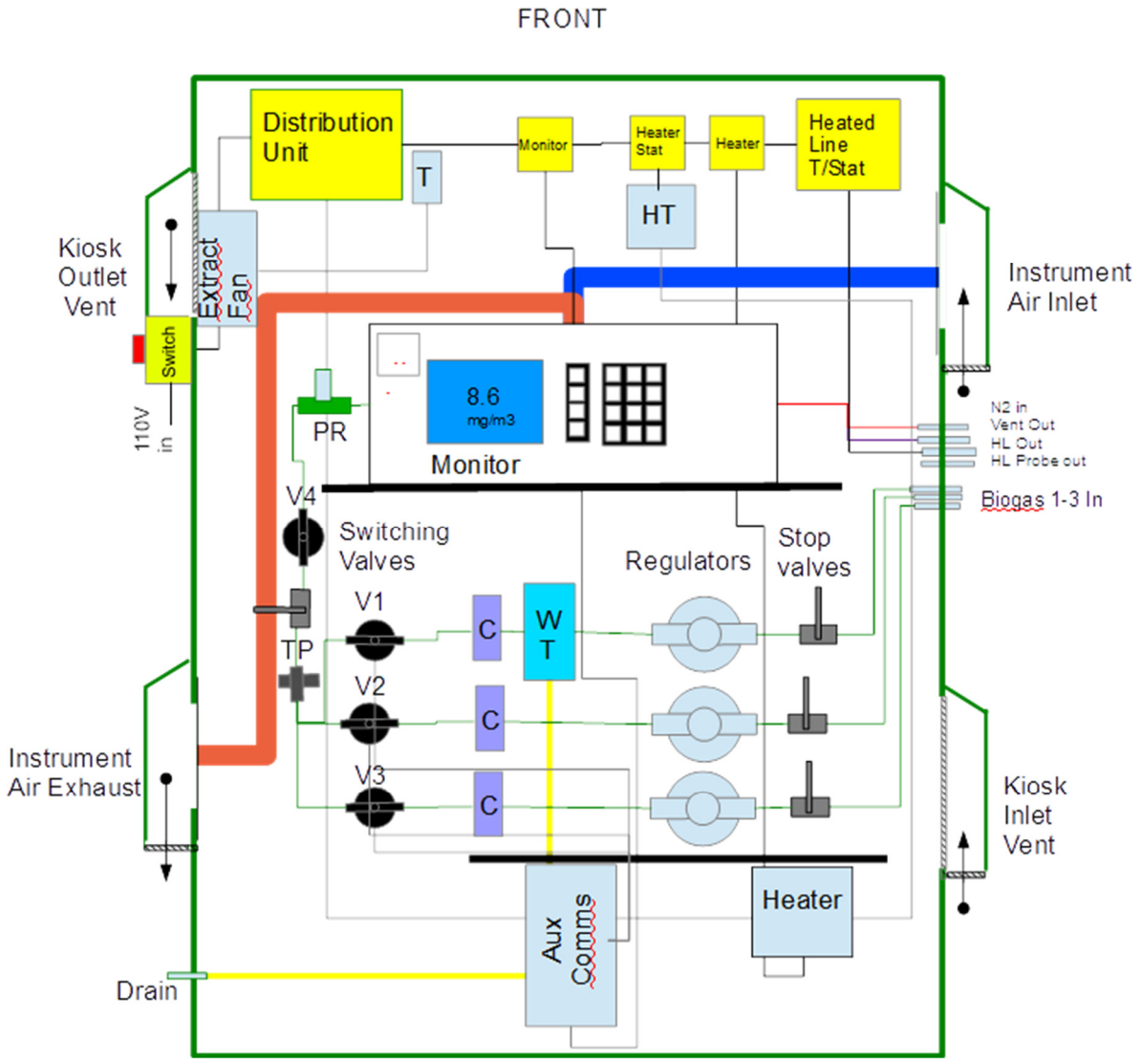
3.1.9 NITROGEN CONNECTION

Before operation the Nitrogen cylinder must be connected and turned on. The Nitrogen is required to be set to 1.0 Bar.

Nitrogen should be of Technical Grade 99.999% purity. A standard N2 regulator should be fitted to the cylinder and the Special adaptor fitting supplied by STS used to connect the ¼” pipe.



4.0 CABINET LAYOUT



Notes:

Connections

- 110V = Mains into case via External Switch.
- HL = Heated line /temperature sensing probe - cable gland
- Vent = Vent line from instrument to atmosphere- Swagelok bulkhead fitting
- N2 = Nitrogen supply from bottle into instrument – swagelok bulkhead fitting
- B1-3 = Biogas line in from sample point(s)- swagelok bulkhead fitting

Components

- WT = Auto-drain water trap, powered from instruments 24V supply
- C = Coalescing water filter to remove water vapour
- FA = Flame Arrestor – detonation/flame propagation inhibitor
- Heat Line = Heated line controller connected to 16A supply
- Dist Unit = Distribution unit with RCDs, 22A supply split to a 16A fused spur for heated line and 6A fused spur for instrument. Fan, autodrain water trap and solenoid valves are powered from instrument (24V).
- Ext Fan = Thermostatically controlled cooling fan.
- T = Thermostat for Fan

The siloxane instrument is designed for installation in a building or kiosk, the instrument and sampling system are available pre-mounted in a weather proof container, the container is provided with all necessary vent and drain and power connections.

If the instrument is being installed in a building or kiosk that contains other equipment, then it should be provided with:

Approved vent connections

Electrical Power

Nitrogen Purge connection

Biogas sampling connections

Drain connection

4.1 VENTILATION

The instrument ventilation is designed to prevent any risk of a build-up of methane inside the instrument, the correct provision of the vents is necessary to ensure that the instrument remains safe.

The ventilation shall be configured so that the air supply to the instrument is drawn through a grill from a horizontal duct laid with a 3 degree fall away from the instrument.

The discharge vent connection shall be discharged outside of the building at a safe location, the discharge vent shall be terminated with a bend to prevent wind driven rain from entering the duct.

4.2 KIOSK IMAGES

4.3 INSTRUMENT CONNECTIONS

4.3.1 BIOGAS CONNECTION

Connection to the instrument is by way of a ¼" swagelok bulkhead fitting with retaining lug.

Label: Biogas IN

4.3.2 NITROGEN CONNECTION

Connection to the instrument is by way of a ¼" swagelok bulkhead fitting with retaining lug.

Label: N2 IN

4.3.3 INSTRUMENT AIR INTAKE

The spigot on the rear of the instrument case has a 50mm OD diameter suitable to connect 50mm ID flexible tubing to it.

Label: Instrument Air Intake

4.3.4 INSTUMENT AIR EXHAUST

The spigot on the rear of the instrument case has a 50mm OD diameter suitable to connect 50mm ID flexible tubing to it.

Label: Instrument Air Exhaust

4.3.5 VENT

Connection to the instrument is by way of a ¼" swagelok bulkhead fitting with retaining lug.

Label: VENT

4.3.6 POWER

A 3pin kettle lead receptacle with on off switch is located on the rear panel.

Label: POWER 110V

 Danger of Electrocution Switch off and isolate from the mains supply before opening the case.

4.3.7 DATACOMMS

A 12 way circular connector is provided for 4-20mV data output. Colour coded BLUE.

Label: DATA COMMS

PCB Connectors to Rear Connector:

Rear PIN	PCB	Label
1	CONN25 PIN 1	Vcc +12V
2	CONN4 PIN 1	M1 +
3	CONN4 PIN 2	M1 Iout
4	CONN5 PIN 1	M2 +
5	CONN5 PIN 2	M2 Iout
6	CONN6 PIN 1	M3 +
7	CONN6 PIN 2	M3 Iout
8	CONN7 PIN 1	M4 +
9	CONN7 PIN 2	M4 Iout
10	CONN25 PIN 2	GND

These are uniquely wired.

Rear plug connector to Metron2 Plug Cable:

Rear PIN	Cable Wire
1	Red
2	Purple
3	White
4	Grey
5	Yellow
6	Brown
7	Orange
8	Green
9	Blue
10	Black

Using a 10way Shielded Multicore Cable

Cable to Metron2 Terminals

Cable Wire	Metron2
Red	Power +
Purple	Input 1 +V
White	Input 1 IN

Grey	Input 2 +V
Yellow	Input 2 IN
Brown	Input 3 +V
Orange	Input 3 IN
Green	Input 4 +V
Blue	Input 4 IN
Black	Power -

4.3.8 ANCILLARY BOX

A 12 way circular connector is provided for ancillary switching services, cabinet fan and water trap power supply. Colour coded RED.

Label: ANCILLARY

PCB Connectors to Rear Connector:

Rear PIN	PCB	Label
1	CONN20 PIN 1	V+ 24V
2	CONN20 PIN 7	WTSense
3	CONN20 PIN 8	V1
4	CONN20 PIN 9	V2
5	CONN20 PIN 10	V3
6	CONN20 PIN 11	V4
7	CONN20 PIN 12	VWT
8	CONN20 PIN 13	SPARE
9	CONN20 PIN 14	SPARE
10	CONN20 PIN 15	GND
SHEILD	CONN20 PIN 16	GND

These are uniquely wired.

Rear plug connector to Manifold Switching Box Plug:

Rear PIN	Cable Wire
1	Red
2	Purple
3	White
4	Grey
5	Yellow
6	Brown
7	Orange
8	Green
9	Blue
10	Black

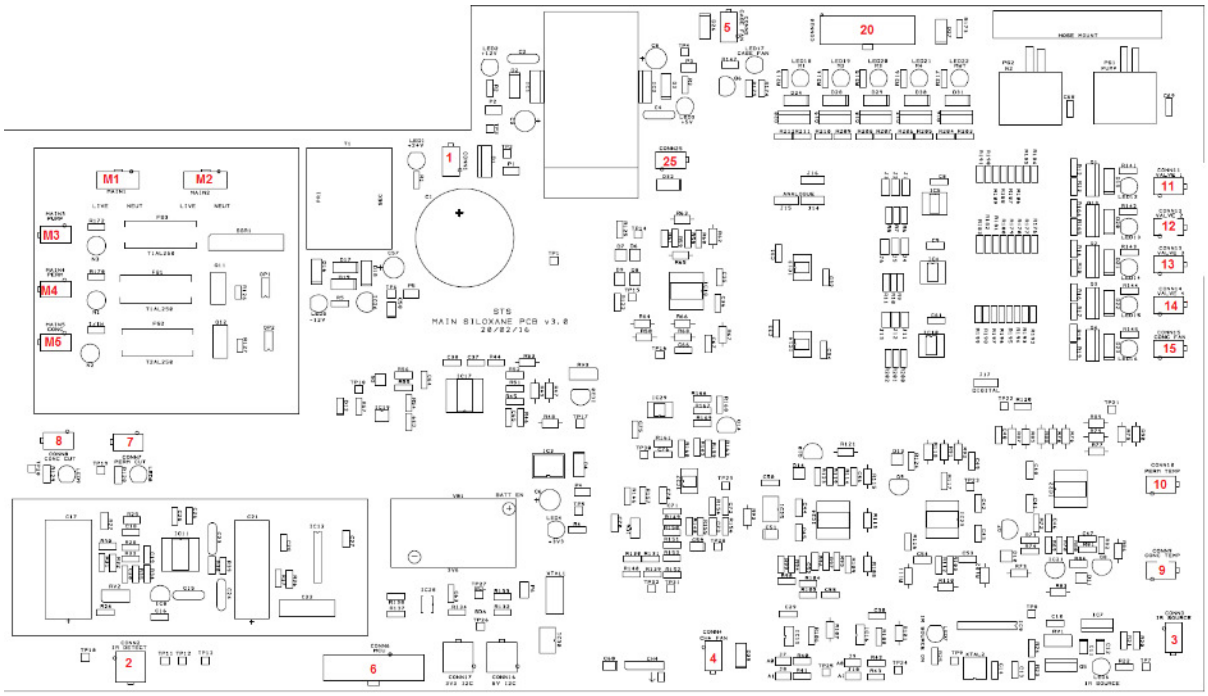
Using a 10way Shielded Multicore Cable

Manifold Socket to Jumpers:

Rear PIN	Cable Wire	Manifold Jumper Position
1	Red	1
2	Purple	7
3	White	8
4	Grey	9
5	Yellow	10
6	Brown	11
7	Orange	12
8	Green	SPARE
9	Blue	SPARE
10	Black	13

4.4 CIRCUIT BOARD CONNECTOR INFORMATION

4.4.1 MAIN SILOX PCB LAYOUT



See Appendix for Enlarged Diagram

Connectors:

1: 24V supply to PCB from Power Supply

2: Infrared Detector

3: Infrared Source

4: Not used

5: Case Fans

6: Connection to MCU PCB

7: Permeation Oven Cut out sensor

8: Concentrator Oven Cut out sensor

9: Concentrator Temperature Sensor

10: Permeation Oven Temperature Sensor

11: Solenoid Valve 1

12: Solenoid Valve 2

13: Solenoid Valve 3

14: Solenoid Valve 4

15: Concentrator Fan

20: Connection to Auxillary control box

25: Heat Sink cooling Fan

M1: Mains 110V to PCB

M2: Mains 110V to Power Supply

M3: Mains to Pump

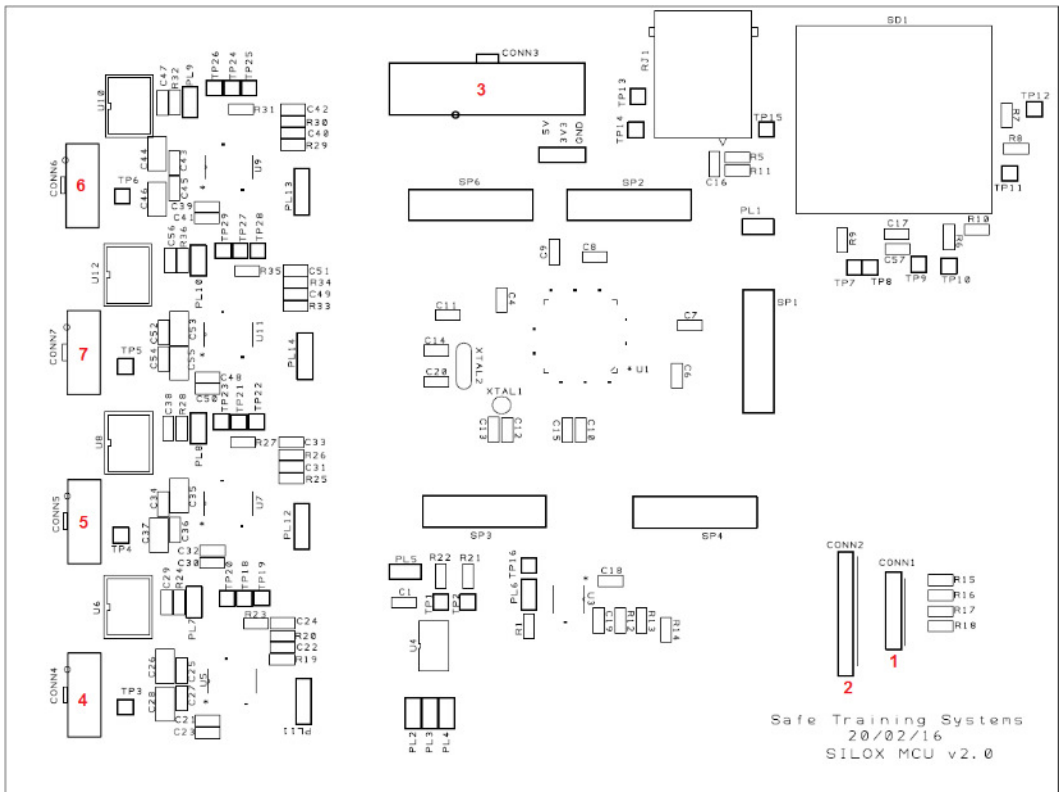
M4: Mains to Permeation Oven Heaters

M5: Mains to Concentrator Heater

 The Silox PCB has a clear plastic shield over the Mains power section to protect users. THIS SHIELD MUST NOT BE REMOVED UNLESS THE INSTRUMENT HAS BEEN ISOLATED FROM THE MAINS SUPPLY AND DISCONNECTED

 Danger of Electrocution Switch off and isolate from the mains supply before opening the case.

4.4.2 MCU PCB



See appendix for enlarged diagram

1: Not USed

2: Membrane Keypad Connection

3: Connection to Main Silox PCB

4: 4-20mA Channel 1

5: 4-20mA Channel 2

6: 4-20mA Channel 3

7: 4-20mA Error Line

5.0 OPERATION

5.1 TURN ON

Once instrument is correctly plumbed and plugged in, the power can be switched on.

- Ensure the SD card is in place.
- The instrument will power up upon mains power. There is a mains switch on the back of the instrument.
- A safety check will run automatically. This may take several minutes when instrument is switched on from cold. Any faults will be displayed. (See Troubleshooting Faults for details)

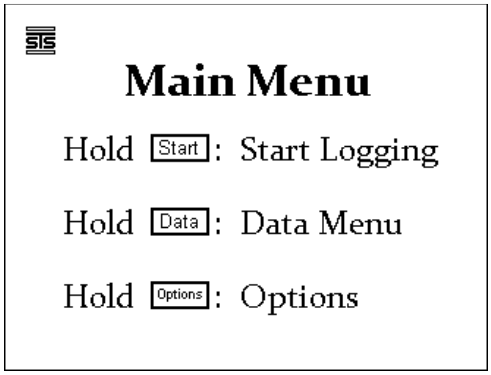
The instrument will not run without the SD card being inserted – please insure it inserted correctly before starting.

The instrument is now Ready and in the Main Menu.

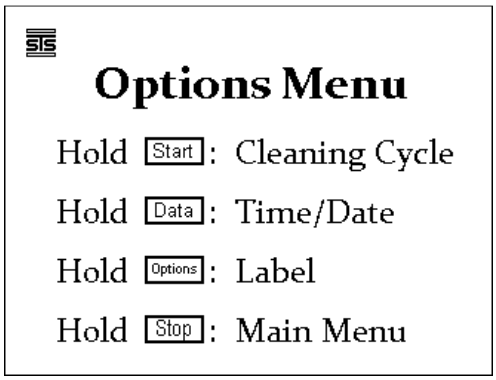
5.2 SET TIME /DATE

The date and Time should be factory set – if not follow the instructions below.

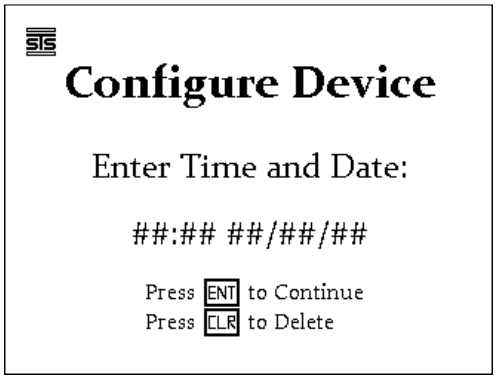
From the main menu select Options.



Select Time/Date by holding Data button:



Time and Date will need to be entered using the alphanumeric keypad. Press **CLEAR** to delete previous, and once ready **ENTER** to continue.

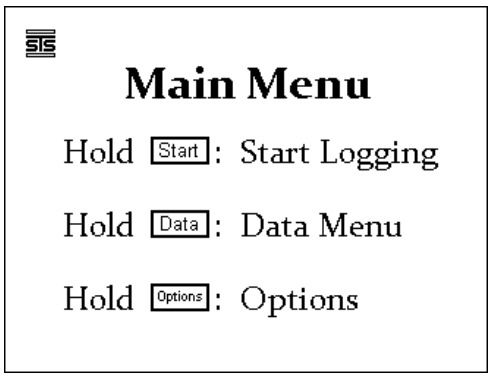


After **ENTER** a confirmation will be asked: Press **START** to confirm

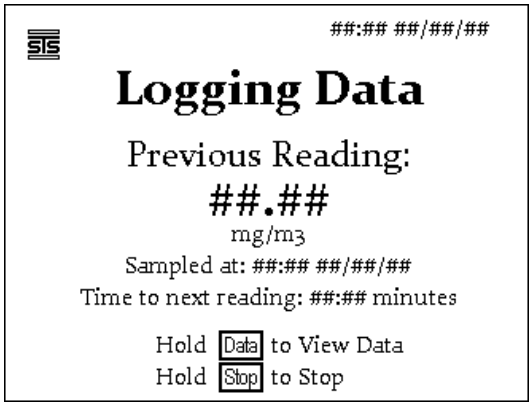
A Label can be set up in the same way by selecting Options and then the Label Option.

5.3 STARTING A READING CYCLE

To start logging select :Start Logging from the menu by holding the start button.



The Instrument is now continuously Logging on a ~1hr Cycle.

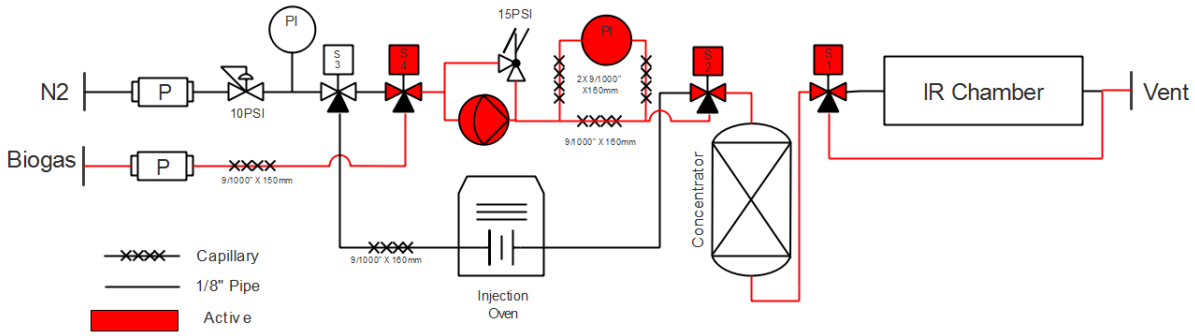


The Instrument will continuously loop this cycle until stopped with the data recorded onto the SD Card.

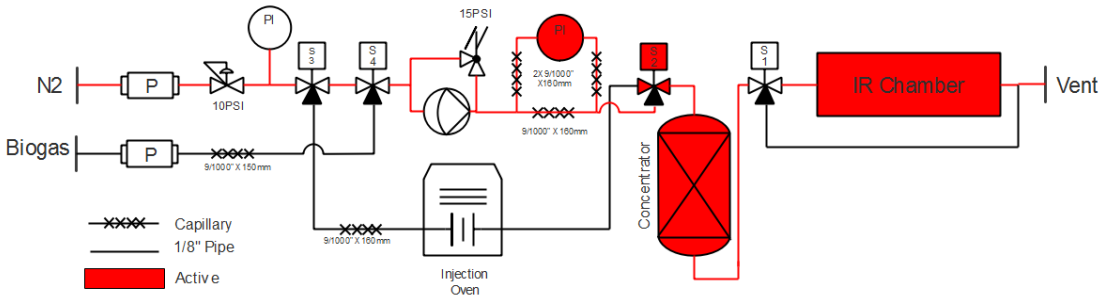
The Instrument has an error margin of approx. +/- 0.5 mg/m3.

If the instrument loses power during a logging cycle, once power is return the instrument recommence logging.

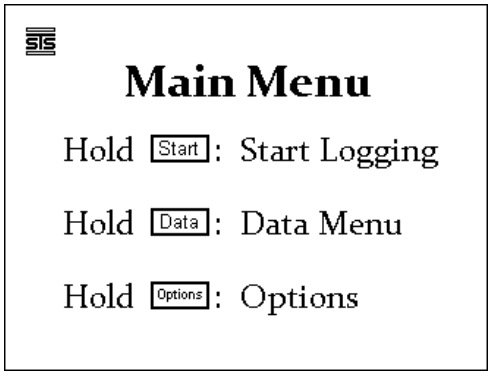
Biogas Sample



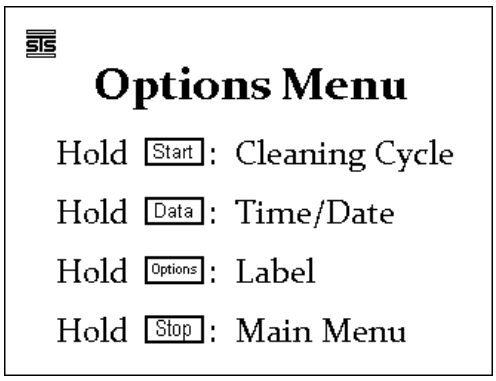
Analysis



5.4 SETTING UP MANIFOLD SWITCHING

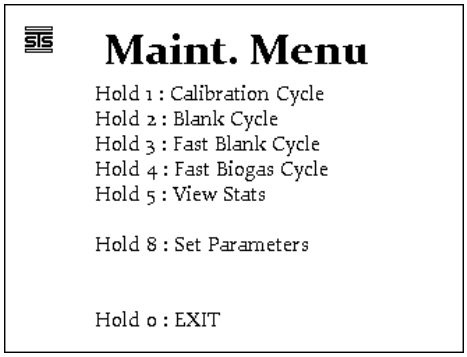


Select Options by holding Options button:

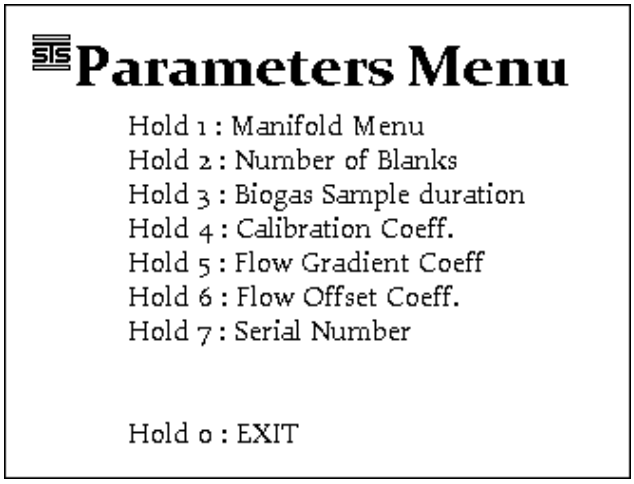


Hold **CLEAR** on the number pad for approximately 4 secs to enter the hidden Maintenance Menu password input screen:

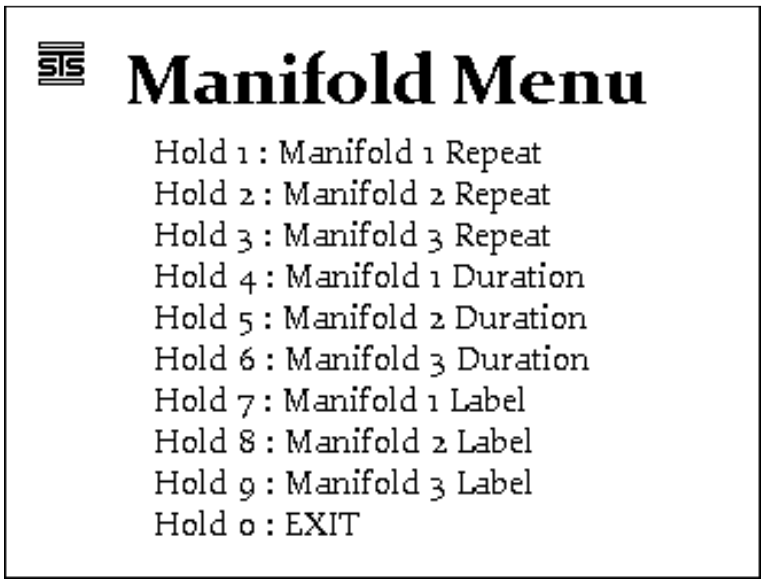
Enter the password "*SILOX*" and press **ENTER**, **START** to confirm.



Hold **8** to enter the set parameters Menu



Hold 1 for the Manifold Menu



Each valve may be operated for a set number of cycles and the sampling time for each line may be set to allow for lower and higher concentrations. The system works so that Manifold 1 will run its cycle for the specified number of repetitions and will then switch to the 2nd Manifold and run the number of repeats set on that channel and so on. Once the 3rd line has completed its cycle it returns to the first manifold and starts again. -see example table below.

A cleaning cycle can also be specified if the gas being sampled is heavily contaminated to prevent build-up of contamination in the instrument. Select item 2 from the menu.

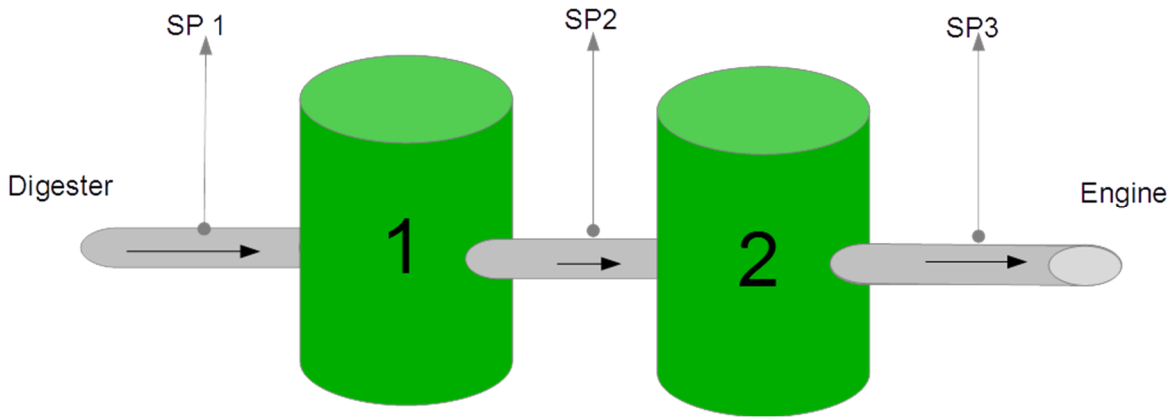
STS would recommend the following durations are set depending on the concentration of Siloxanes in the gas being measured.

Up to 50mg/m^3 – Sample duration set to 20 Mins

50-100 mg/m^3 – Sample duration set to 10 Mins

Over 100 mg/m^3 – Sample duration set to 5 Mins

Manifold switching for a Lead-Lag arrangement:



Example Switching table:

Manifold No.	Sampling Point	Estimated Concentration	No of Repeats	Sample Duration
1	SP3- Post Carbon Filter 2	8 mg/m3	24	20
2	SP2- Between Filters 1 & 2	30 mg/m3	12	20
3	SP1- Pre Carbon Filter 1 (raw gas)	120 mg/m3	3	5
1	SP3- Post Carbon Filter 2	8 mg/m3	24	20
2	SP2- Between Filters 1 & 2	30 mg/m3	12	20
3	SP1- Pre Carbon Filter 1 (raw gas)	120 mg/m3	3	5
etc				

Example table with a Blank cleaning cycle between each series.

Manifold No.	Sampling Point	Estimated Concentration	No of Repeats	Sample Duration
1	SP3- Post Carbon Filter 2	8 mg/m3	24	20
Blank	n/a	-	1	-
2	SP2- Between Filters 1 & 2	30 mg/m3	12	20
Blank	n/a	-	1	-
3	SP1- Pre Carbon Filter 1 (raw gas)	120 mg/m3	3	5
Blank	n/a	-	1	-
1	SP3- Post Carbon Filter 2	8 mg/m3	24	20
Blank	n/a	-	1	-
2	SP2- Between Filters 1 & 2	30 mg/m3	12	20
Blank	n/a	-	1	-
3	SP1- Pre Carbon Filter 1 (raw gas)	120 mg/m3	3	5
Blank	n/a	-	1	-
etc				

5.5 REMOTE DATA COMMS SET UP

See the Data Capture Manual for set up and use of the Data connection.

6.0 COMMISSIONING CHECKLIST

STS Siloxane Monitor QA

Instrument Serial Number _____

Customer_____ Site_____

SET PARAMETERS

	Result/Set Point
Instrument Voltage Supply -110V 22A	

TEST & QA

Regulators	V07 Back Pressure ~15PSi	
	RO7 N2 Pressure ~10PSi	
Solenoids & Pump	S1 correct orientation	
	S2 correct orientation	
	S3 correct orientation	
	S4 correct orientation	
Plumbing & Fittings	Check Route correct	
	Fixtures Secured	
Concentration Oven	Check Heaters and Temp Sensor Secured	
	Check Fan working	
Power Supply &PCBs	All Connections secure	
	Check cables labelled	
	Mains shield in place	
	Detector shield in place	
Case	Check case fan orientation	
	SD card inserted and functioning	
	Check keypad function	
	Check bulkhead labels	
	Check SN label	
	Check case sealed	
	Check all case fixings in place	
Operation	Run biogas sampling cycle x 3	

INSTRUMENT TEST LOG

Operation	Date	Start Time	End Time	Outcome

KIOSK

Electrical installation correct	
Instrument air intake grille in place	
Kiosk Vent grille in place	
Pipework secured	
Inlet/Exhaust ducts secured correctly to correct vents	
Exhaust Fan orientation correct	
Thermostat & Fan operational test	
Metron Comms box installed and tested	
Solenoid operation tested	
Regulator flow direction correct	
Regulator Flow rate set to <35mbar	
Water trap flow direction correct	
Water Trap function checked	
Coalescer flow direction correct	
Flame trap flow direction correct	
Rear bulkhead fittings secured to clamps	
Leak checked	
All pipework labelled	
Warning labels in place	
Serial number label in place	

KIOSK TEST LOG

Tightness Test	Date	Start Time	End Time	Outcome

7.0 FAULT IDENTIFICATION

7.1 INSTRUMENT ERROR CODES

All Faults will cause instrument to enter a Safe Mode Configuration. In Safe Mode the instrument disables the heaters and the biogas input into the system.

- Fault# 1: Communications Error. Board Faulty.
- Fault# 2: Low Nitrogen Error. Check supply pressure, if empty -Replace Supply. If there is still an error, internal Plumbing is Faulty.
- Fault# 4: High Nitrogen Error. Internal Plumbing is Faulty.
- Fault# 8: Sample Volume Low. Internal Pump Faulty.
- Fault# 10: Sample Volume High. Internal Pump Faulty, or Biogas Pressure too high.
- Fault# 20: Concentrator Oven Low Error. Oven Heater is Faulty or Board.
- Fault# 40: Concentrator Oven High Error. Oven Heater is Faulty or Board.
- Fault# 80: Calibration Oven Low Error. Oven Heater is Faulty or Board.
- Fault# 100: Calibration Oven High Error. Oven Heater is Faulty or Board.
- Fault# 200: Internal Temperature High Error. Internal temperature is >60degreesC. Installation error or Oven Heater error.
- Fault# 400: CH4 High Error. Instrument CH4 threshold has been exceeded. Installation error, or internal plumbing.
- Fault# Optical Signal: Instrument analytical system or board faulty.
- Fault# Fans Faulty: Instrument purging fans or board faulty.

Instrument will need resetting via the mains power upon a fault however an Internal Temperature error will automatically reset once the internal temperature has dropped below the threshold.

To reset the instrument at the error screen, hold STOP.

7.2 4-20MA REMOTE DATA ERROR CODES

Error line 4-20mA reading:

0: Standby

25: Communications Fault

50: Fan Fault

75: CH4 High Fault

100: N2 Fault

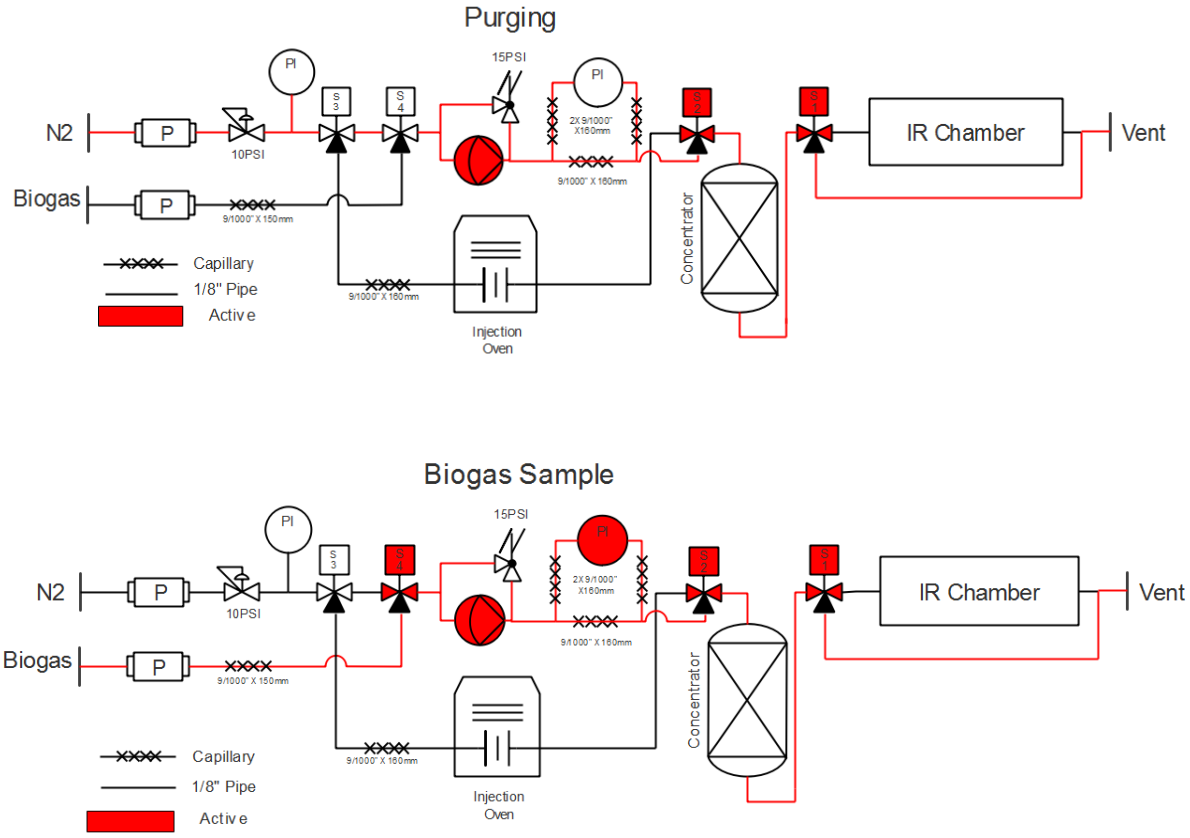
125: Internal Temp Fault

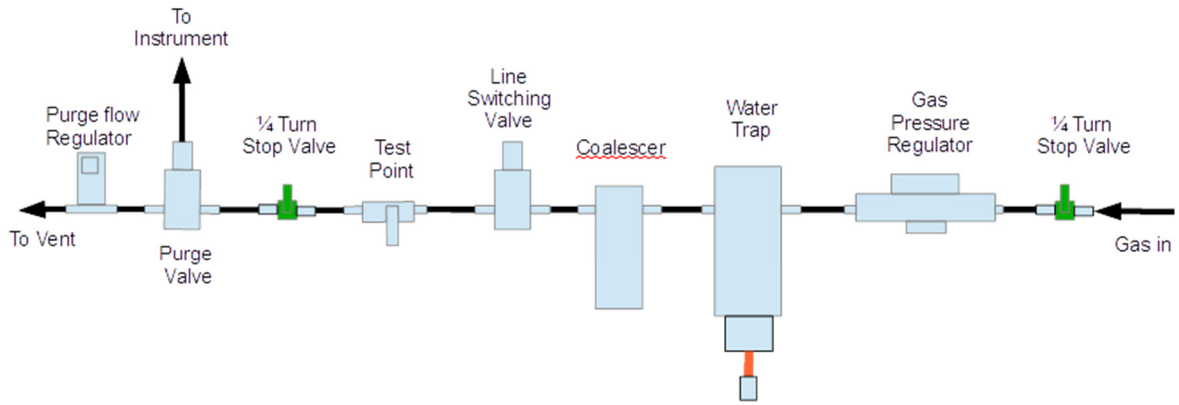
150: Biogas Volume Fault

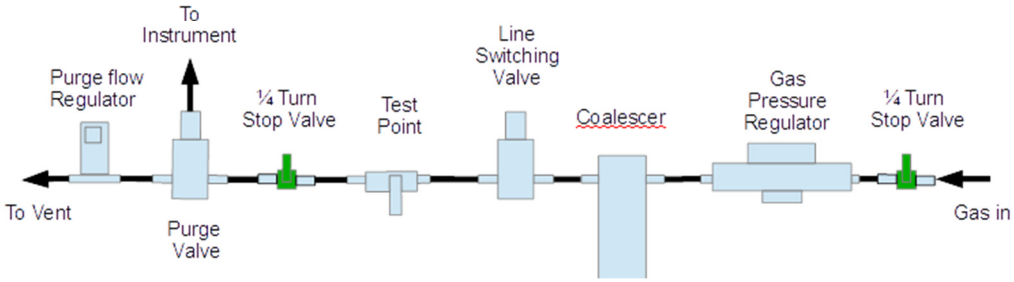
175: Concentrator Temp Fault

200: Logging Normally

8.0 APPENDICES




To
Instrument
Purge flow
Regulator
¼ Turn
Stop Valve
Test
Point
Line
Switching
Valve
Coalescer
Water
Trap
Gas
Pressure
Regulator
¼ Turn
Stop Valve
To Vent
Purge
Valve
Gas in


To
Instrument
Purge flow
Regulator
¼ Turn
Stop Valve
Test
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Line
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Coalescer
Gas
Pressure
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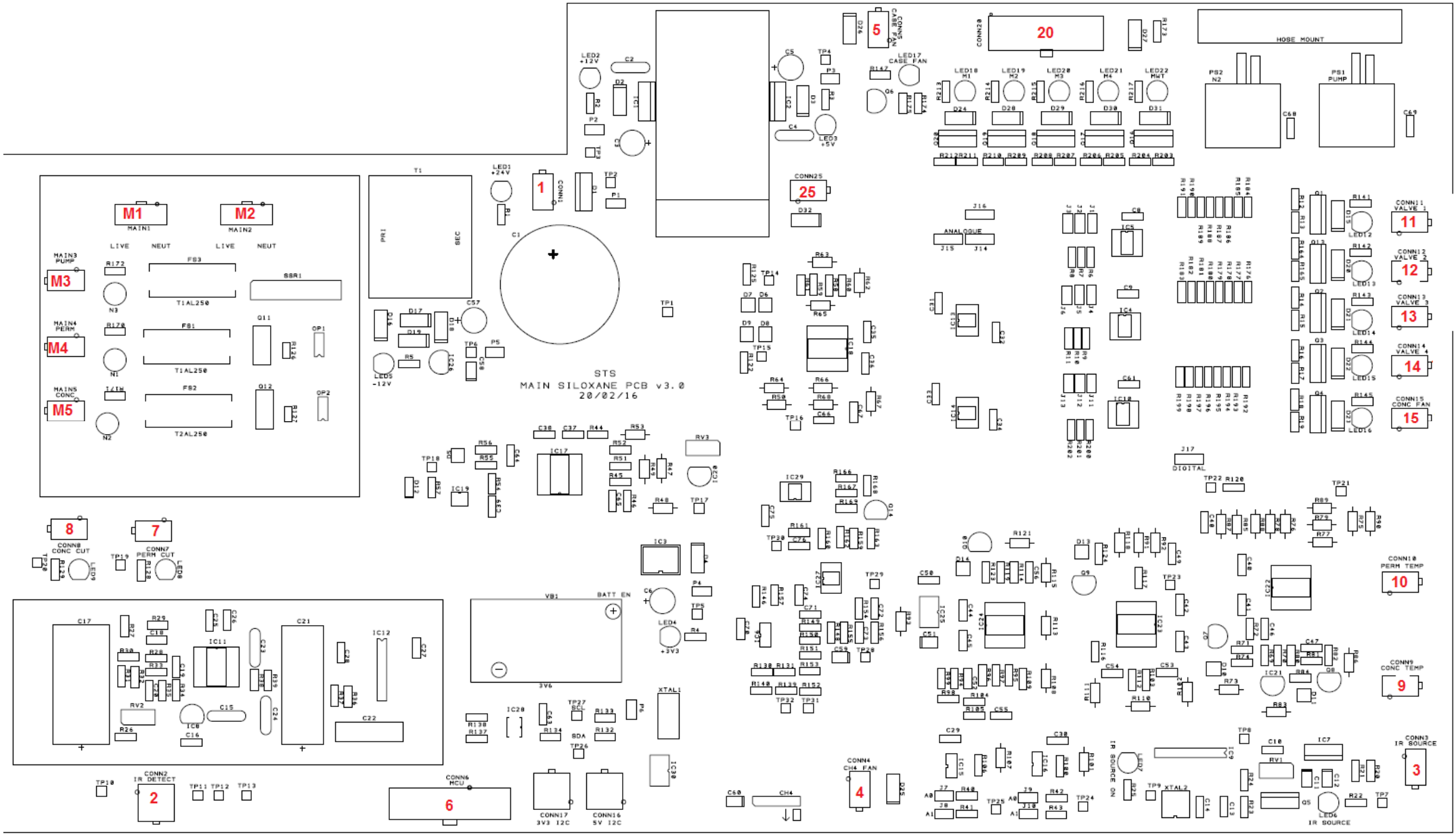
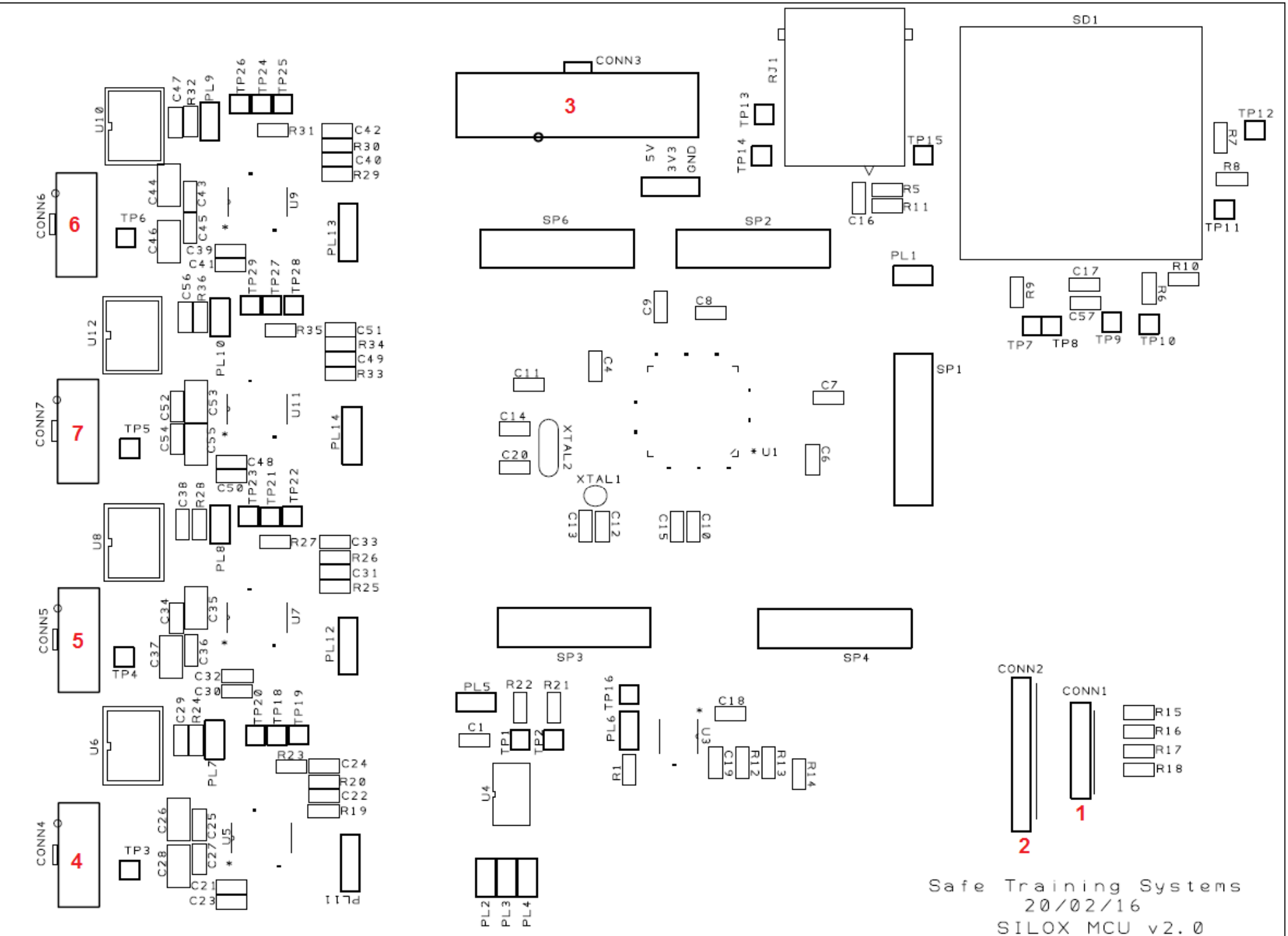
¼ Turn
Stop Valve
To Vent
Purge
Valve
Gas in


STS
MAIN SILOXANE PCB v3.0
20/02/16
M1
MAIN1
M2
MAIN2
M3
MAIN3 PUMP
M4
MAIN4 PERM
M5
MAIN5 CONC
LIVE
NEUT
T1AL250
T2AL250
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
20
25
HOSE MOUNT
CONN1 VALVE 1
CONN2 VALVE 2
CONN3 VALVE 3
CONN4 VALVE 4
CONN5 CONC FAN
CONN7 PERM CUT
CONN8 CONC CUT
CONN9 CONC TEMP
CONN10 PERM TEMP
CONN2 IR DETECT
CONN3 IR SOURCE
CONN4 CH4 FAN
CONN5 CASE FAN
CONN6 MCU
CONN16 5V I2C
CONN17 3V3 I2C
ANALOGUE
DIGITAL
PS1 PUMP
PS2 N2
LED1 +24V
LED2 +12V
LED3 +5V
LED4 +3V3
LED5 -12V
LED6 IR SOURCE
LED8
LED9
LED12
LED13
LED14
LED15
LED16
LED17 CASE FAN
LED18 M1
LED19 M2
LED20 M3
LED21 M4
LED22 MWT
IR SOURCE ON
BATT EN
3V6
XTAL1
XTAL2
SDA
SCL



Safe Training Systems
20/02/16
SILOX MCU v2.0