2018

STS Instruments Ltd, Repair & Parts Manual

SILOXANE MONITOR MANUAL

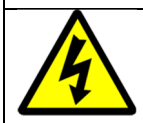
TABLE OF CONTENTS

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	16/08/2017	1.2 Electrical distribution amended, heater and thermostat added P29+30 Added kiosk diagram and gas flow paths to appendices P45/46

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.

1.4 INSTRUMENTATION SAFETY SYMBOLS

	Caution
	Electrical Hazard
	Earth Point

	Hot Surface

2.0 SYSTEM COMPONENTS

2.1 MONITOR

2.2 INSTRUMENT CONNECTIONS

2.2.1 BIOGAS CONNECTION

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

Label: Biogas IN

2.2.2 NITROGEN CONNECTION

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

Label: N2 IN

2.2.3 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

2.2.4 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

2.2.5 VENT

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

Label: VENT

2.2.6 POWER

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

Label: POWER 110V

2.2.7 DATACOMMS

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

Label: DATA COMMS

2.2.8 DATA CONNECTION LINE

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

2.2.9 ANCILLARY CONNECTION

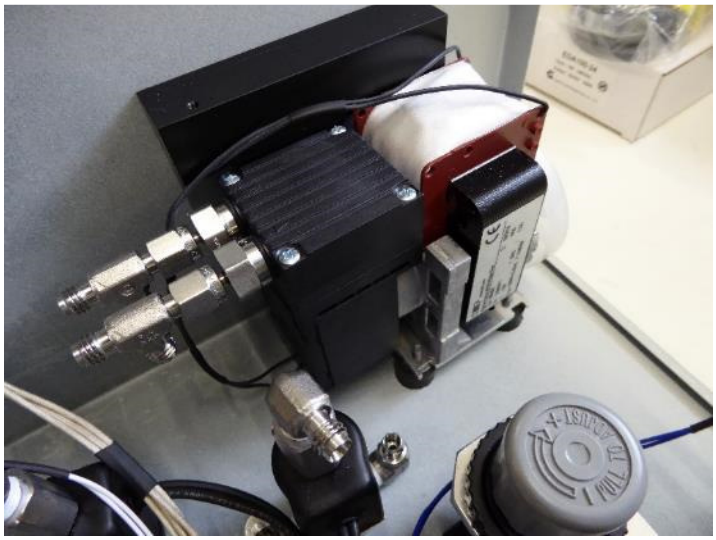
A 12-way circular connector is provided for ancillary switching services, cabinet fan and water trap power supply. Colour coded RED.

Label: ANCILLARY

2.3 SUB ASSEMBLIES & REPAIRS

2.3.1 PUMP

Whole Assembly Part Number 301



If the pump is failing to run it should be replaced with a new pump and returned to STS for overhaul, this is not a field serviceable item.

2.3.2 CONCENTRATOR

Whole Assembly part Number 400

The concentrator consists of a housing that contains 2 cartridge heaters, a concentrator tube, a thermal cut-out and a cooling fan.

MODES OF FAILURE

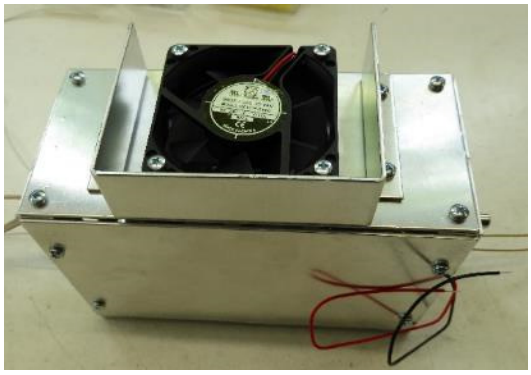
- Tripping of the thermal cut-out should the temperature exceed the set threshold – causing instrument to be put into safe mode.
- Failure of one or more heaters causing either the thermal cut-out to trigger or the instrument to display error code:
- Failure of the concentrator tube, this would be seen by a steadily increasing background signal not returning to zero.

REPAIRS TO CONCENTRATOR

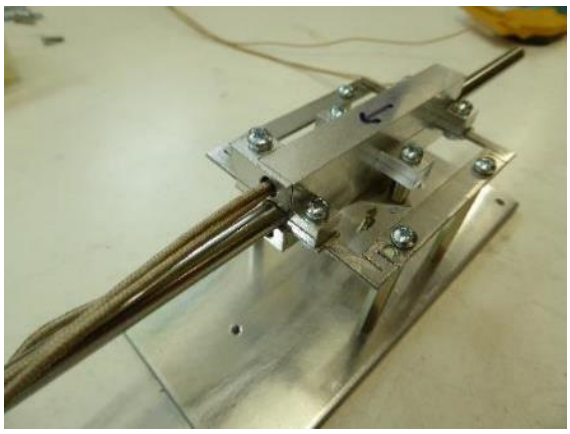
The concentrator is heated to over 180C and so must be handled with care 

Disconnect the concentrator by undoing the nut at each end and disconnecting the heater, temperature sensor and temperature cut-out leads from the PCB.

Lift out the concentrator and undo the 4 screws securing the top plate with the fan mounted on it.

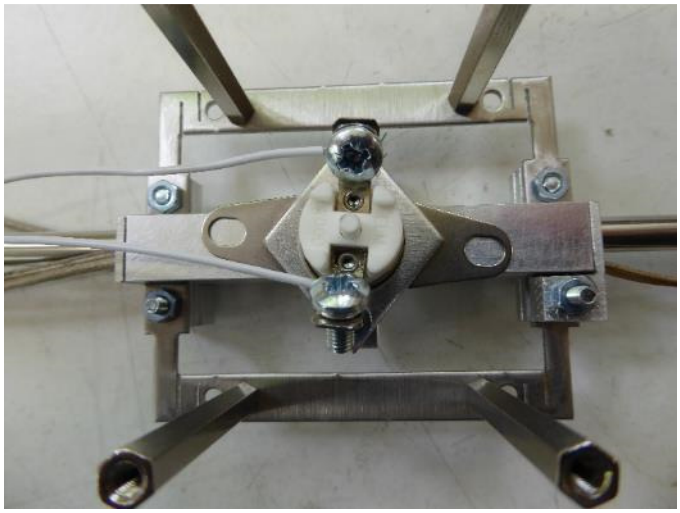


Inside the case is a heater block as below. To remove the heater undo the retaining screw on the end plate and slide out the heater and the retaining ring.

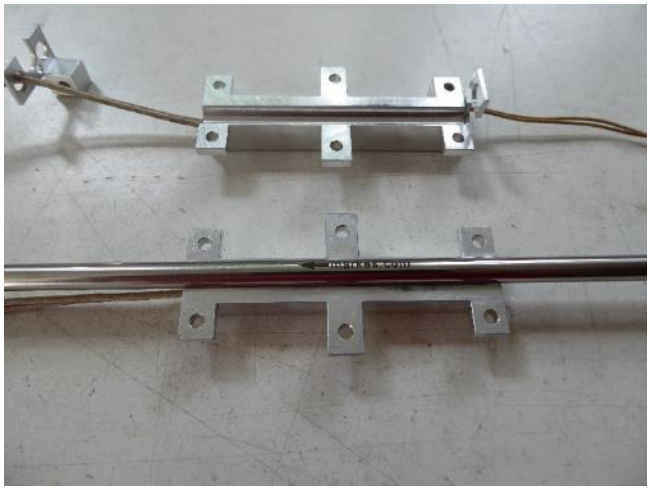


Ensure that when replacing the heater it is rewired in Parallel with the 2nd heater – if changing heaters both units should be changed simultaneously.

The Temperature cut-out is resettable by pressing the button in the centre of the cut-out. It should be noted though that the reason for the sensor tripping must be established before the instrument is re-commissioned.



The concentrator tube is replaced by undoing the retaining plate at each end of the heater block and then undoing the 6 screws holding the 2 halves of the heater block together. When separated the tube can be removed and replaced with a new one.



The replacement tube must be inserted in the correct flow orientation as is marked on the tube.

2.3.3 PARTICLE FILTERS

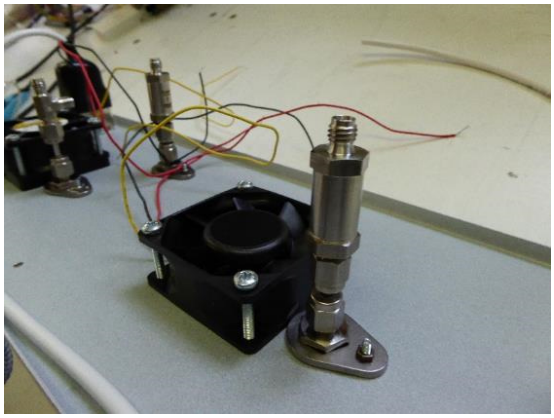
Whole assembly part No. SS-2F-2

MODE OF FAILURE

Low N2 pressure error and instrument in safe mode, or, drop in sample volume measured and potential low pressure to pump causing pump error and placed in safe mode.

REPAIR & REPLACEMENT

There are particle filters on both the biogas and nitrogen inlets to the instrument. These are designed to capture very fine particles that could cause blocking to the capillaries in the instruments gas piping. If there is a restricted flow in either case it should be checked that the filters are not blocked.



To do so remove the filter by undoing the Swagelok fittings removing the filter and blowing through with compressed air. Ensure the filter is replaced in the correct orientation when refitting. If the filter is heavily contaminated replace with new and return old unit to STS for service.

2.3.4 REGULATOR N2

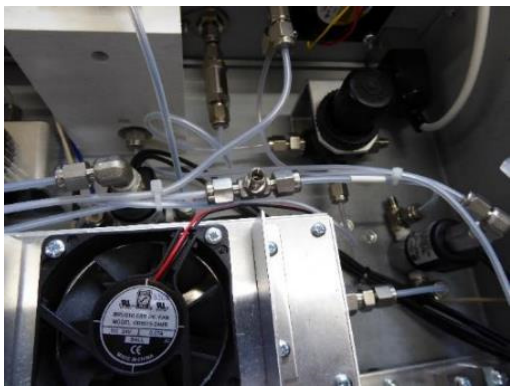
Whole assembly part No. 304

MODE OF FAILURE

High or Low N2 Pressure Error displayed and instrument in safe mode.

REPAIR AND REPLACEMENT N2 REGULATOR

Should the Nitrogen regulator fail, disconnect the Swagelok fittings and replace with new part, reconnect and leak check.



2.3.5 BACK PRESSURE REGULATOR

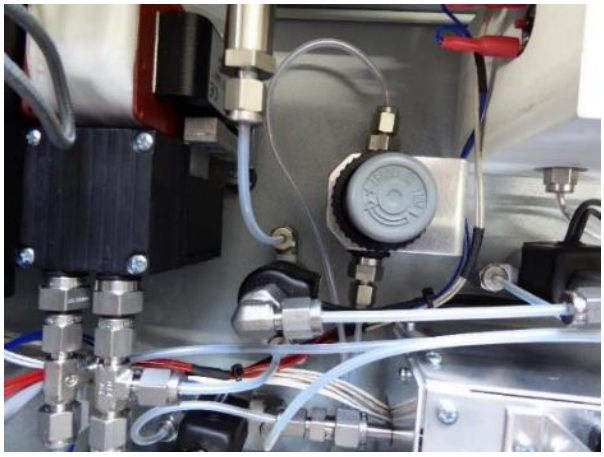
Whole assembly part No. 303

MODE OF FAILURE

Low or High sample volume, erratic readings, potential pump error due to insufficient flow and in safe mode.

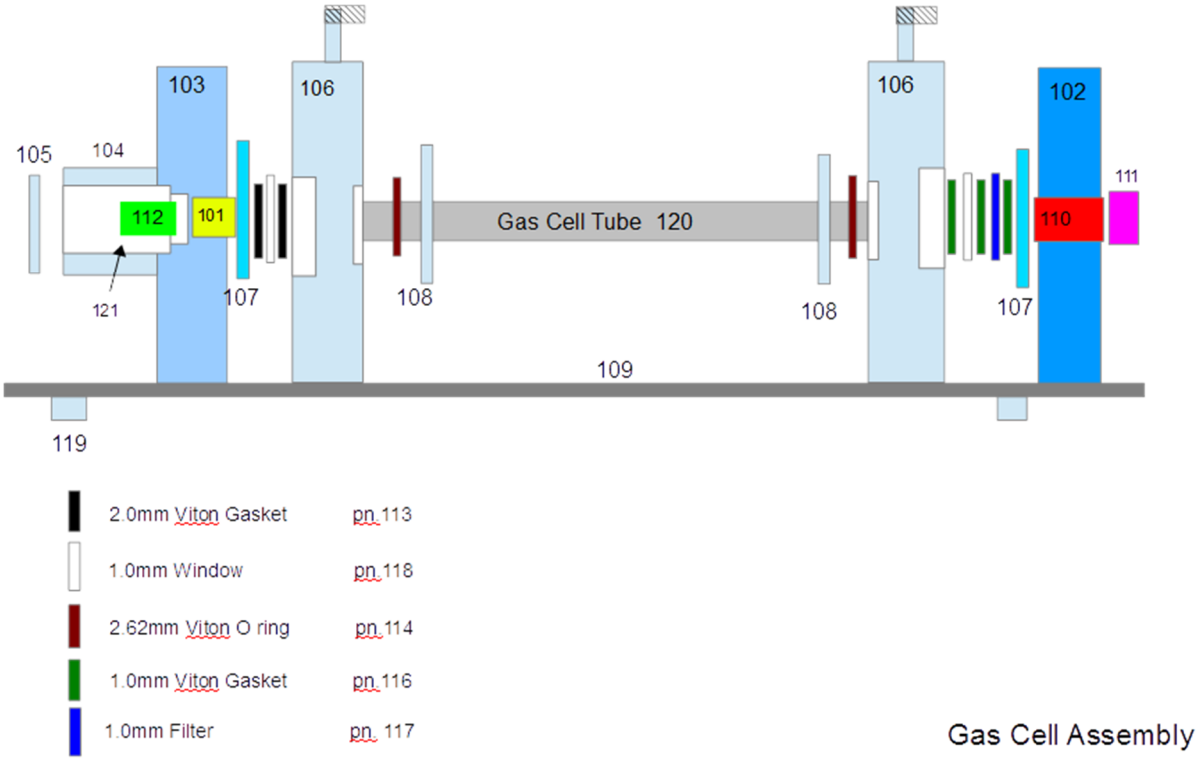
REPAIR AND REPLACEMENT BACK PRESSURE REGULATOR

Should the back pressure regulator fail, disconnect the Swagelok fittings and replace with new part, reconnect and leak check.

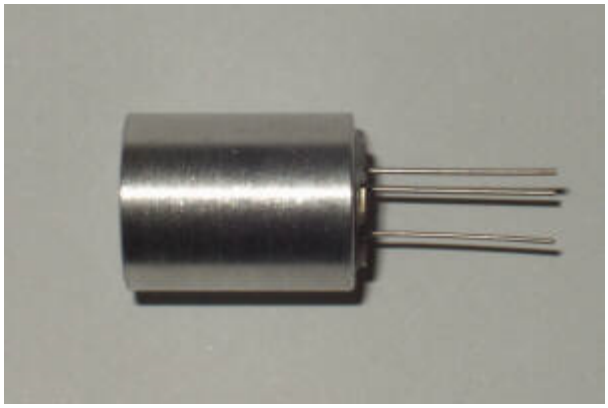


2.3.6 OPTICAL BENCH

Whole Assembly part No. 100



2.3.6.1 IR SOURCE



Assembly Part No. 110

MODE OF FAILURE

Erratic or no readings, drift over time in readings

REPAIR AND REPLACEMENT IR SOURCE

Disconnect the Source from the PCB, undo the screws in the mounting block and withdraw the source. Replace with a new unit.

> The source is an expensive precision device and requires careful handling, Identification of problems with IR Source are difficult -please refer to STS before changing.

2.3.6.2 IR DETECTOR

Whole Assembly part No. 112

MODE OF FAILURE

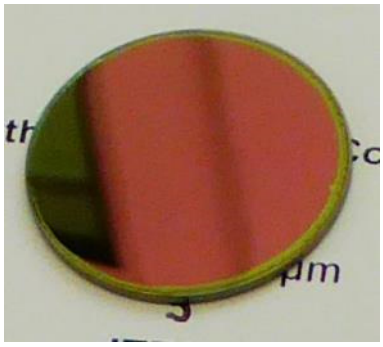
Erratic or no readings, drift over time of readings.

REPAIR AND REPLACEMENT IR DETECTOR

Disconnect the detector connector from the PCB, undo the screws holding the mounting box in position and withdraw the detector. Replace in reverse order.

> The Detector is an expensive precision device and requires careful handling, Identification of problems with IR detector are difficult -please refer to STS before changing.

2.3.6.3 OPTICAL FILTER



Assembly Part No. 118

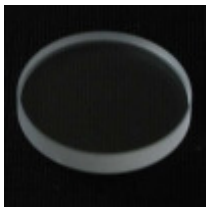
MODE OF FAILURE

Erratic or no readings, drift over time of readings.

REPAIR AND REPLACEMENT OPTICAL FILTER

Return entire bench assembly to STS for replacement

2.3.6.4 CAF2 OPTICAL WINDOWS



Assembly Part No. 118

MODE OF FAILURE

Erratic or no readings, drift over time of readings.

REPAIR AND REPLACEMENT CAF2 WINDOWS

Return entire bench assembly to STS for replacement

2.3.7 SOLENOID VALVES

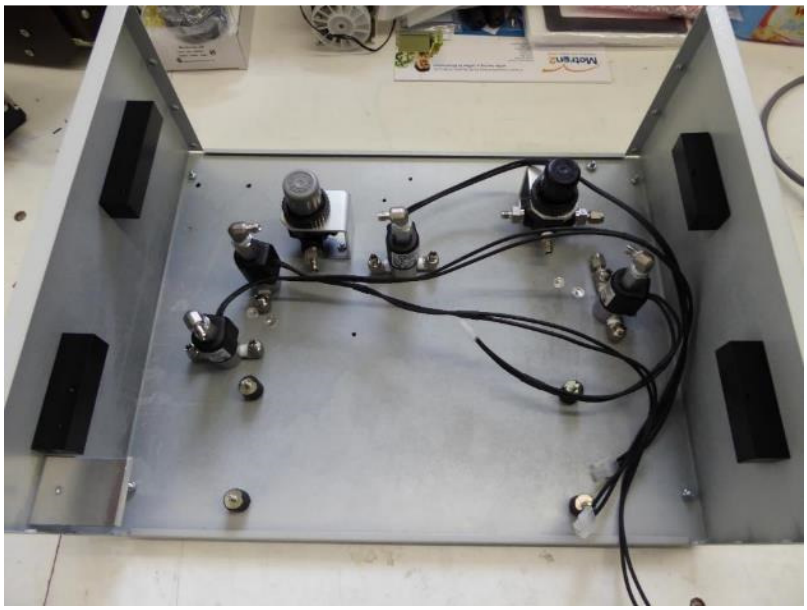
Part No. 307

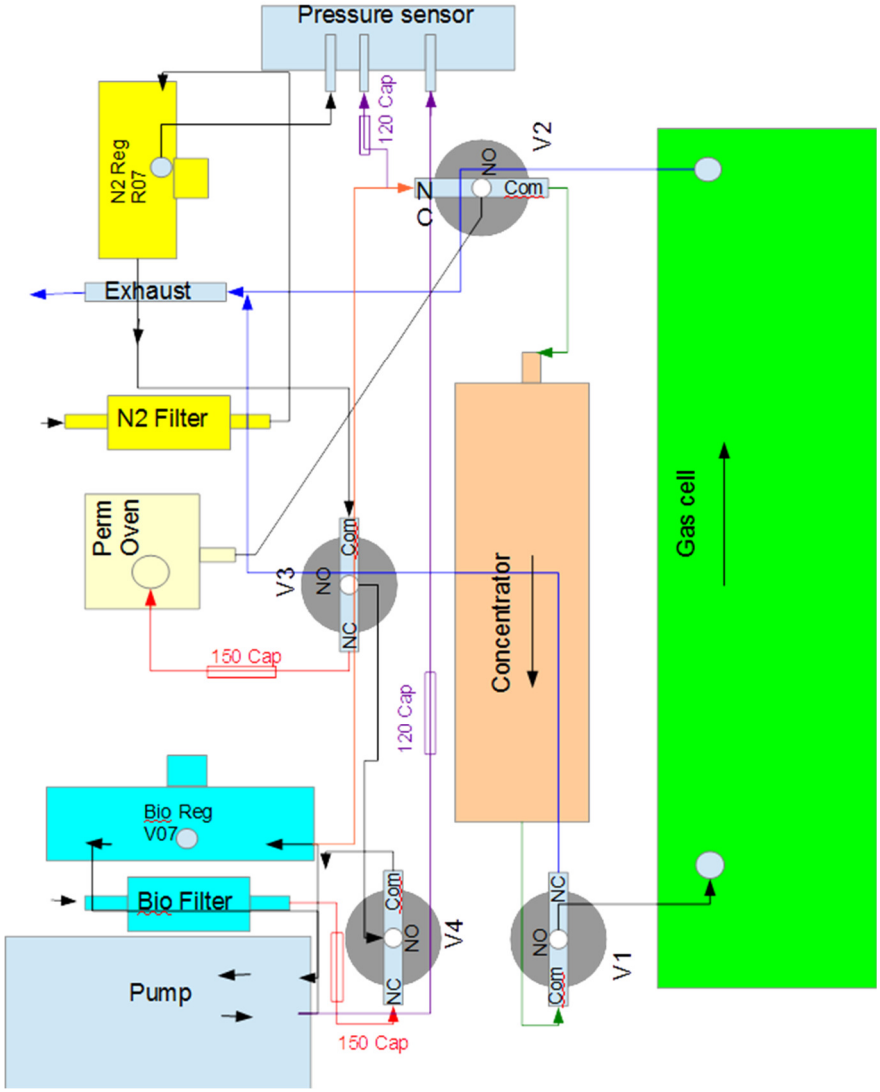
MODE OF FAILURE

Failure of solenoid to actuate as expected. No flow through instrument, Readings erratic.

REPAIR AND REPLACEMENT SOLENOID VALVES

Ensure connection is made correctly to PCB and that the pipework to the solenoid is correctly orientated, check for any leaks. To replace, disconnect electrical connector from PCB, disconnect pipework from valve, undo retaining screws through the base of the instrument and lift out. Replace with new unit ensuring correct orientation and connection for each solenoid. (see instrument pipework layout diagram)





2.3.8 SD CARD

Part No. 221

MODE OF FAILURE

No data written to card, data corrupted and cannot be downloaded, instrument fails to start with error message. (the instrument will not run without the SD card in place)

REPAIR AND REPLACEMENT SD CARD

Replace with New Card.

3.0 ANCILLARY COMPONENTS

3.1 COMPONENTS LIST

Pressure Regulator

Solenoid Valves(s)

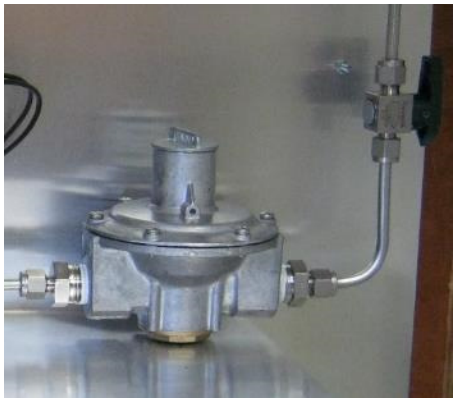
Water Trap

Coalescing Filter

Communications Box

Ancillary Box

3.1.1 PRESSURE REGULATOR



Whole assembly part No. 816+ 817

MODE OF FAILURE

Increase or decrease in pressure to monitor – will result in larger/smaller sample volumes – damage will not occur to the instrument unless in excess of 1 bar is applied.

REPAIR AND REPLACEMENT PRESSURE REGULATOR

Note the regulator has a maximum inlet pressure of 350mbar and is set to max 35mbar operating pressure - if changing the regulator ensure the spring is changed to a brown spring – see parts list for ref No.

To change isolate gas flow at preceding valve, undo Swagelok connections and remove clamping plate by removing 4 x m4 nuts. Replace unit and clamp and reconnect. Use a manometer to set the pressure to max 35mbar using the test point adjacent to the regulator. (unscrew the bung in the top of the regulator and adjust using a large flat screwdriver) Once set the instrument should be run and the pressure re tested as the effect of the pump in the instrument may require adjustment of the set position.

3.1.2 AUTOMATED WATER TRAP

Whole Assembly part No. 806

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 connections box, this supplies the unit with 24V DC power.

MODE OF FAILURE

Failure to empty reservoir.

REPAIR AND REPLACEMENT WATER TRAP

Isolate gas flow by shutting valve prior to regulator. Isolate the power by turning the unit off at the external kill switch and the switch on the rear power connector of the instrument. Open ancillary box and disconnect cables to auto-trap, pull wires out of gland having loosened the gland nut first. Undo Swagelok fittings and remove trap, replace with new trap and reconnect Swagelok. Pass cables into ancillary box and reconnect as per below diagram. Leak Check.

See ancillary wiring diagram in 3.1.10

 Danger of Electric shock -ensure power is isolated before commencing work.

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.

3.1.3 COALESCING FILTER

Whole assembly part No. 803 (filter only 804)

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. 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.

MODE OF FAILURE

Evidence of moisture inside the housing.

REPAIR AND REPLACEMENT COALESCING FILTER

Check auto-drain trap is functioning correctly. If so isolate the gas supply by shutting the ball valve prior to the regulator. Replace filter in coalescer by unscrewing the bowl anticlockwise, removing the filter cartridge and replace with new one. Dry out the bowl and replace. Open the Ball valve and leak check. The coalesce should then be checked daily to ensure water is no longer evident- any water entering the instrument will cause damage to the measurement system.

The Coalescer should not have any water in it! If water is present, please contact STS urgently for advice.

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

3.1.4 4-20mA DATA LINE

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

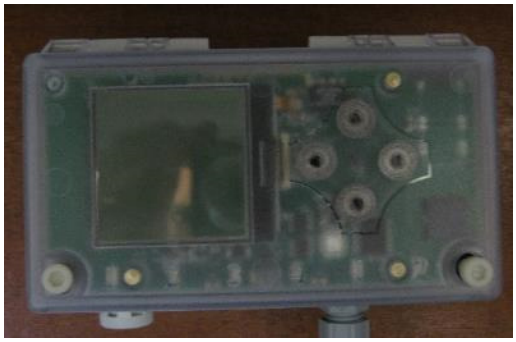
MODE OF FAILURE

No data supplied.

REPAIR AND REPLACEMENT DATA LINE

Isolate the instruments power by turning off at the instrument switch on the rear panel and the exterior kiosk kill switch. Open the instrument top cover and check the connections to the MCU PCB. If any connections are loose remake the connectors and retest. If no physical defect can be seen please refer to STS Engineers for advice.

3.1.5 DATA COMMUNICATIONS BOX



Assembly part No. 836

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.

MODE OF FAILURE

No data supplied. Potential issue with software or with GSM signal

REPAIR AND REPLACEMENT DATA COMMS BOX

There are no serviceable parts inside the communication box – please refer to STS Engineers for advice. STS will advise on reboot procedure to attempt reconnection. If replacement is necessary the unit is disconnected from the instrument by removing the Blue connector from the rear instrument panel and then removing the 2 screws attaching the unit to the backboard.

3.1.6 SOLENOID SWITCHING VALVES

Assembly part No. 307

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

MODE OF FAILURE

Failure to actuate leading to no gas flow through system

REPAIR AND REPLACEMENT

Turn off instrument at rear panel switch, also turn off at kill switch on outside of kiosk. Open the front of the Ancillary box and check the connections to the solenoid are secure, check that the red connector on the rear instrument panel is correctly located and secure. If connections are correct isolate gas supply at ball valve prior to the regulator. Disconnect Swagelok fittings and disconnect connection to ancillary box. Loosen the gland on the Aux box and remove the cable, replace unit do up Swagelok fittings and pass cable back through gland into ancillary box. Check the cabling diagram to ensure correct connection, replace lid and turn on power to unit. Open the incoming gas valve and leak and pressure check. Ensure solenoid now opens correctly.

See Ancillary Wiring Diagram in 3.1.10

Danger of Electric shock -ensure power is isolated before commencing work.

3.1.7 KIOSK ENCLOSURE FAN CONTROL

Assembly part nos. 808 & 809

For ventilation of the kiosk and temperature control.

MODE OF FAILURE

Fan is not running, check temperature set point on the thermostat – this should be set to 10C.

REPAIR AND REPLACEMENT KIOSK FAN

Adjust the temperature set point on the thermostat so that the temperature is below the current temperature, the fan should trigger.

If the fan fails to start turn off instrument at rear panel switch, also turn off at kill switch on outside of kiosk. Open the front of the Ancillary box and check the connections to the solenoid are secure, check that the red connector on the rear instrument panel is correctly located and secure.

Check the connections to the thermostat and the fan are good. If no connections issues are found check for continuity from the thermostat to the comms box if this is still good change the thermostat and retest. If this does not work replace the fan. Ensure all connections are secure before replacing the Ancillary box cover.

See wiring diagram in 3.1.10

 Danger of Electric shock -ensure power is isolated before commencing work.

3.1.8 HEATED LINE

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

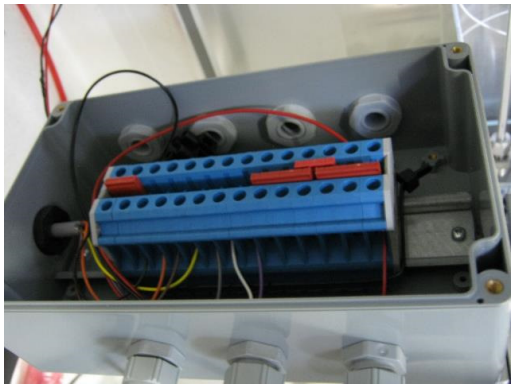
MODE OF FAILURE

Fluctuation appears in monitor results; line is not heating.

REPAIR AND REPLACEMENT HEATED LINE & THERMOSTAT

Check that the fuse in the distribution box has not tripped. If in place use a temperature probe to check if line is being heated. If there is no heat being supplied turn off instrument at rear panel switch, also turn off at kill switch on outside of kiosk. See 6.5 for wiring details

3.1.9 ANCILLARY BOX



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

Input Cable wiring to DIN rail junction block:

PIN	Input Name	Input Cable Colour
1 to 6	+24V	Red
7	WTSense	Purple
8	V1	White
9	V2	Grey
10	V3	Yellow
11	V4	Brown
12	VWT	Orange
13 to 14	GND	Black

Note: Cable wires Blue and Green must be terminated into a junction block. Pins with a common connection are linked together via a jumper.

Output Cables wiring:

PIN	Output Name
1	Case Fan +V
2	V1 +
3	V2 +
4	V3 +
5	V4 +
6	VWT +
7	WT SENSE +
8	V1 -
9	V2 -
10	V3 -
11	V4 -
12	VWT -
13	WT SENSE -
14	Case Fan -V

Note: V = Switching Valve. WT = Water Trap. SENSE is the float sensor.

MODE OF FAILURE

Failure of operation of solenoids, water trap or Case fan.

REPAIR AND REPLACEMENT ANCILLARY BOX

The ancillary box is powered from the instrument via a RED connector on the rear panel. Before opening the ancillary box isolate the power on the rear of the instrument and the external kill switch. Open the box and verify the connections to the box are intact and secure.

Check the RED connector to the rear of the instrument to ensure correctly mated – Use a volt meter to check continuity from connector to box terminals.

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

If a fault cannot be identified in the connector, please refer to STS engineers for further advice.

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

4.0 SWAGELOK CONNECTIONS

4.1 CORRECT FITTING REPLACEMENT PROCEDURE

INSTALLATION INSTRUCTIONS

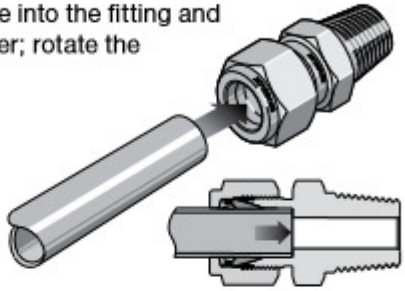
Swagelok Tube Fittings

Up to 1 in./25 mm

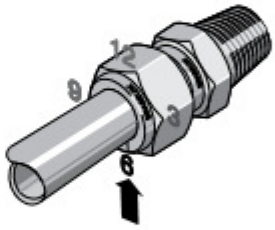
These instructions apply both to traditional fittings and to fittings with the advanced back-ferrule geometry.

Fully insert the tube into the fitting and against the shoulder; rotate the nut finger-tight.

High-pressure applications and high safety-factor systems: *Further tighten the nut until the tube will not turn by hand or move axially in the fitting.*

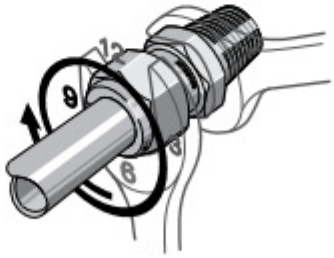


Mark the nut at the 6 o'clock position.



While holding the fitting body steady, tighten the nut one and one-quarter turns to the 9 o'clock position.

For 1/16, 1/8, and 3/16 in.; 2, 3, and 4 mm tube fittings, tighten the nut three-quarters turn to the 3 o'clock position.

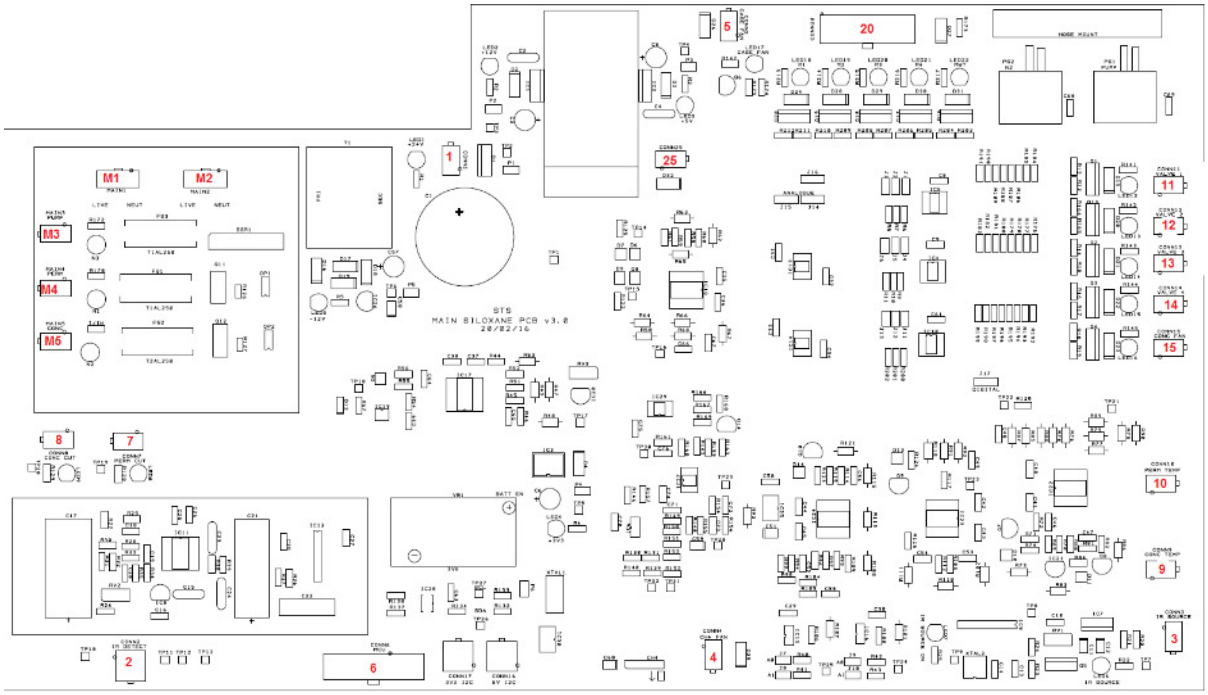


10

5.0 CIRCUIT BOARD

5.1 CIRCUIT BOARD CONNNECTIONS

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



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 Ancillary control box

25: Heat Sink cooling Fan

M1: Mains 110V to PCB

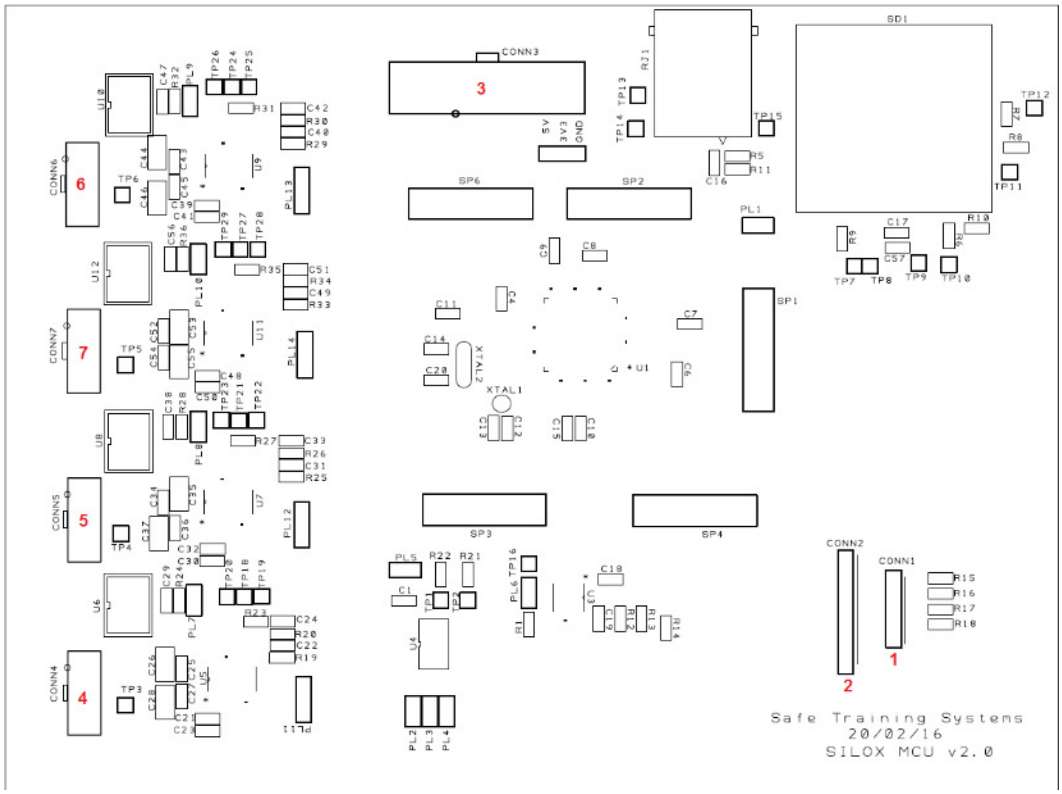
M2: Mains 110V to Power Supply

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



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

5.2 CIRCUIT BOARD CONNECTION REPLACEMENTS

The connectors on the PCB are all made using Molex mini-fit Junior connectors – these must be made using the correct connector tool and part. Part nos. 701-704

5.3 CIRCUIT BOARD TESTING

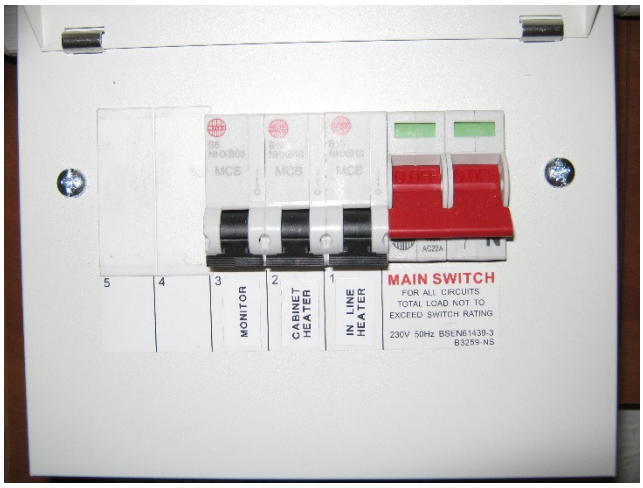
Testing of the PCB requires specialist equipment and should be referred to STS for advice.

6.0 ELECTRICAL INSTALLATION

6.1 SUPPLY VOLTAGE AND CURRENT

The instrument kiosk requires to be supplied with a 110V centre tapped supply capable of providing a total of 26Amps – 10Amps to the heated line and 6Amps to the instrument and 10A to the heater.

6.2 DISTRIBUTION BOX



Power from the external switch is passed via trunking to the Distribution box mounted in the top left corner of the kiosk. The distribution box splits the line into 16A and 6A supplies to RCDs.

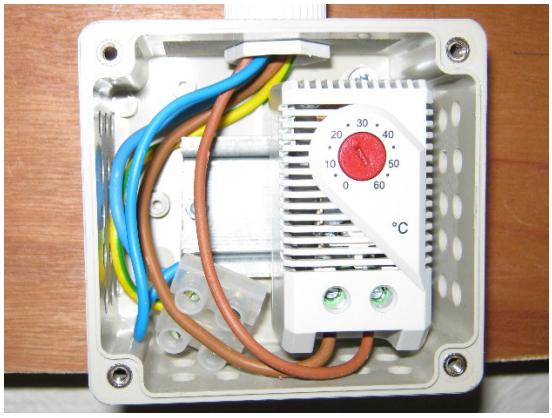
6.3 FLEX OUTLET

Flex outlets are supplied from the distribution box – the Siloxane monitor should be connected to this flex outlet using the kettle lead provided.

6.4 EXTERNAL SWITCH

The External Kill switch is a 2 position switch On/Off and feeds the 110V supply to the distribution box in the kiosk. Setting this switch to the off position will cause the instrument to power off and be placed into Safe Mode shutting off the gas supply to the instrument.

6.5 CABINET HEATER AND THERMOSTAT



The cabinet may be fitted with a heater to prevent condensation and potential condensing of siloxanes in the pipework. The heater is rated at 400W and is provided with power via a flex outlet from a 10A MCB in the distribution box. The heater is controlled by a thermostat housed above the instrument and set to ~23C

6.6 HEATED LINE & THERMOSTAT

The Thermostat is directly wired from the Distribution box's 16A breaker, the line is a constant wattage arrangement set to 60C. The Heated line can be cut to length, a termination kit is available and is supplied on initial install. Once connected the heated line should be bundled with the sample lines(s) and a weather proof insulation such Pertec applied with all joints sealed to prevent water ingress.

The Unit comes with an armoured capillary attached to the thermostat which must be passed through a gland and also bundled into the insulation at the closest point possible to the kiosk. Any exposed heater line or capillary must also be insulated.

6.5.1 HEATED LINE SPECIFICATION

EMTF CE

Electrical heating tape for freeze protection or process heating of pipework and vessels.

MICROTRACER

Constant Wattage Heating Tape

- Withstand temperatures upto 200°C
- Available in outputs upto 50W/m
- Can be cut to length at site
- Particularly suited to small bore pipework
- Full range of controls and accessories
- Available for 110/120 and 220/240VAC
- High Corrosion Resistance

FEATURES

Microtracer type EMTF is a medium temperature parallel resistance, constant wattage, cut-to-length heating tape that can be used for freeze protection or process heating.

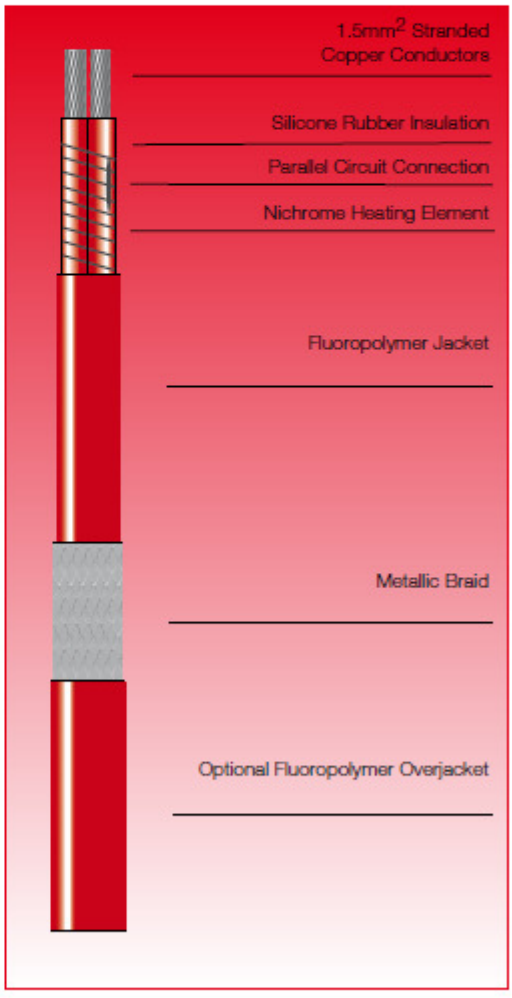
It is particularly suited to small instrument impulse, analyser lines, or process pipes located in non-hazardous areas.

Microtracer type EMTF is chosen when short or moderate circuit lengths are required (select Minitracer if longer circuits are required).

The installation of EMTF heating tape is quick and simple and requires no special skills or tools. Termination and power connection components are all provided in convenient kits.

OPTIONS

EMTF..C	Tinned copper braid provides mechanical protection for base heater and may be used when traced equipment does not provide an effective earth path.
EMTF..CF	Fluoropolymer overjacket over tinned copper braid provides protection where corrosive chemical solutions of vapours may be present.



HEAT TRACE™
SETTING THE STANDARDS LEADING THE WAY

FM APPROVED

SPECIFICATION

MAXIMUM TEMPERATURE	Un-energised Energised	200°C (392°F) See Table
MINIMUM INSTALLATION TEMPERATURE		-80°C (-112°F)
POWER SUPPLY		220 - 240 VAC or 110 - 120 VAC

WEIGHTS & DIMENSIONS

Type Ref	Nom. Dims. (mm) +/-0.5	Weight kg/100m	Min. Bending radius (mm)	Gland Size
EMTF	7.2 x 4.0	6.4	20	M16
EMTF..C	8.2 x 5.0	9.6	25	M16
EMTF..CF	9.0 x 5.8	12.0	30	M16

CONSTRUCTION

Grade	2.2 to BS6351:Part 1
Heating Element	Nickel Chromium
Power Conductors	Tin Plated Copper 1.5mm^2
Conductor Insulation	Silicone Rubber
Jacket	Fluoropolymer (FEP)
Braid	Tinned Copper
Overjacket (Optional)	Fluoropolymer (FEP)

ORDERING INFORMATION

Example 33 EMTF2-CF

- 33 — Output 33W/m
- EMTF — Microtracer type EMTF
- 2 — Supply Voltage 220 - 240 VAC
- C — Tinned Copper Braid
- F — Fluoropolymer overjacket

ACCESSORIES

Heat Trace supply a complete range of accessories including termination/splice kits, end seals, junction boxes and controls. These items are recommended for the correct operation of EMTF products.

MAXIMUM PIPE / WORKPIECE TEMPERATURES

The surface of the heater must not exceed the maximum withstand temperature of its constructional materials. This is ensured by limiting the pipe or workpiece temperature to a safe level either by design calculation (a Stabilised Design) or by means of temperature controls.

For worst case conditions, the temperature of steel pipes should be limited to the following levels:-

MAXIMUM PIPE/WORKPIECE TEMPERATURES (°C)

HEATER NOMINAL OUTPUT (W/m)	MAXIMUM PERMISSIBLE PIPE TEMP (°C)		
	EMTF	EMTF-C	EMTF-CF
6.5	190	190	190
13	175	175	185
23	135	145	155
33	95	100	100
50	45	60	70

For conditions other than worst case, or pipes of other materials (eg. Plastic, Stainless Steel, etc.), consult Heat Trace

Tolerances: Voltage +10%; Resistance +10%; -0%

Pipe temperatures higher than those given above may be accommodated by using Heat Trace Ltd voltage compensating devices eg. POWERMATCH™ - call for further details.

MAXIMUM CIRCUIT LENGTH

OUTPUT (W/m)	MAX. CIRCUIT LENGTH* 115V	230V	ZONE LENGTH (NOM.) 115V	230V
6.5	82m	164m	1000mm	1500mm
13	58m	116m	800mm	1100mm
23	44m	87m	900mm	1000mm
33	36m	73m	750mm	1000mm
50	30m	59m	1000mm	1000mm

*For ±10% end-to-end power output variation

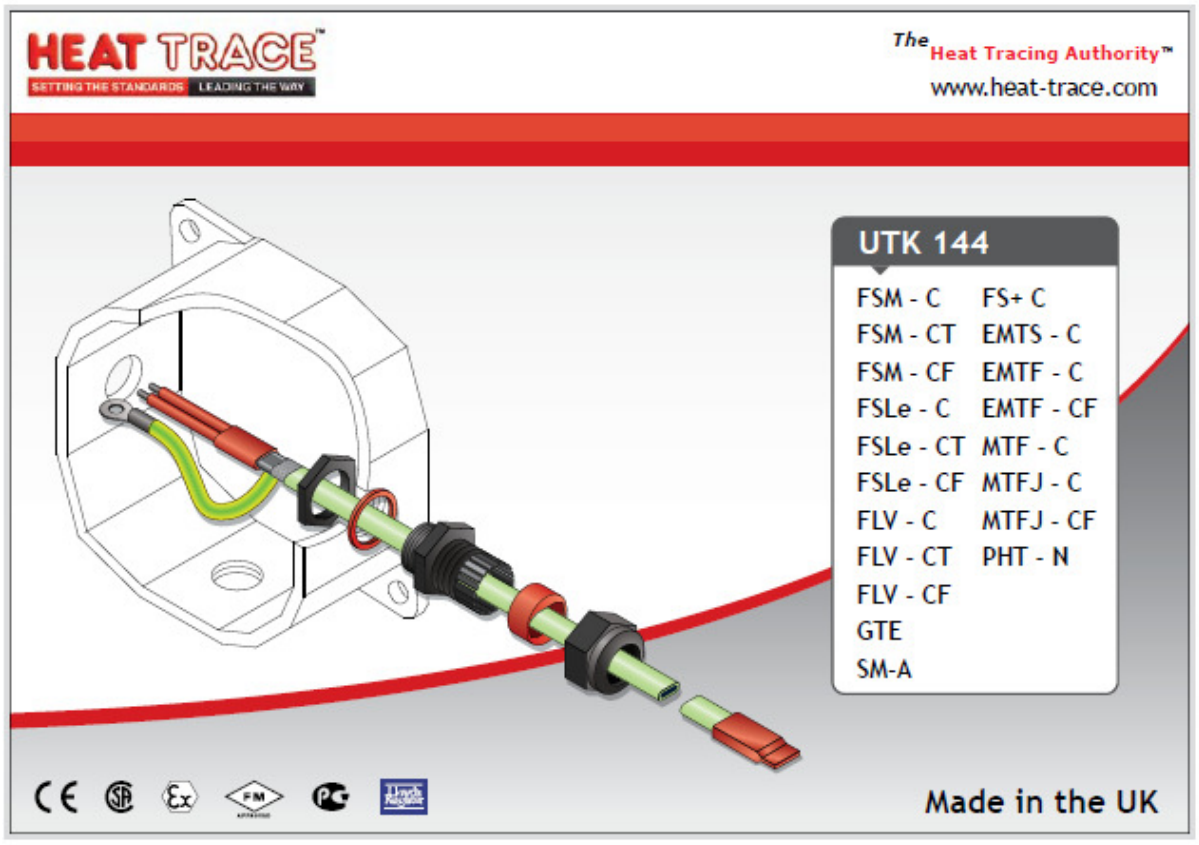
POWER CONVERSION FACTORS

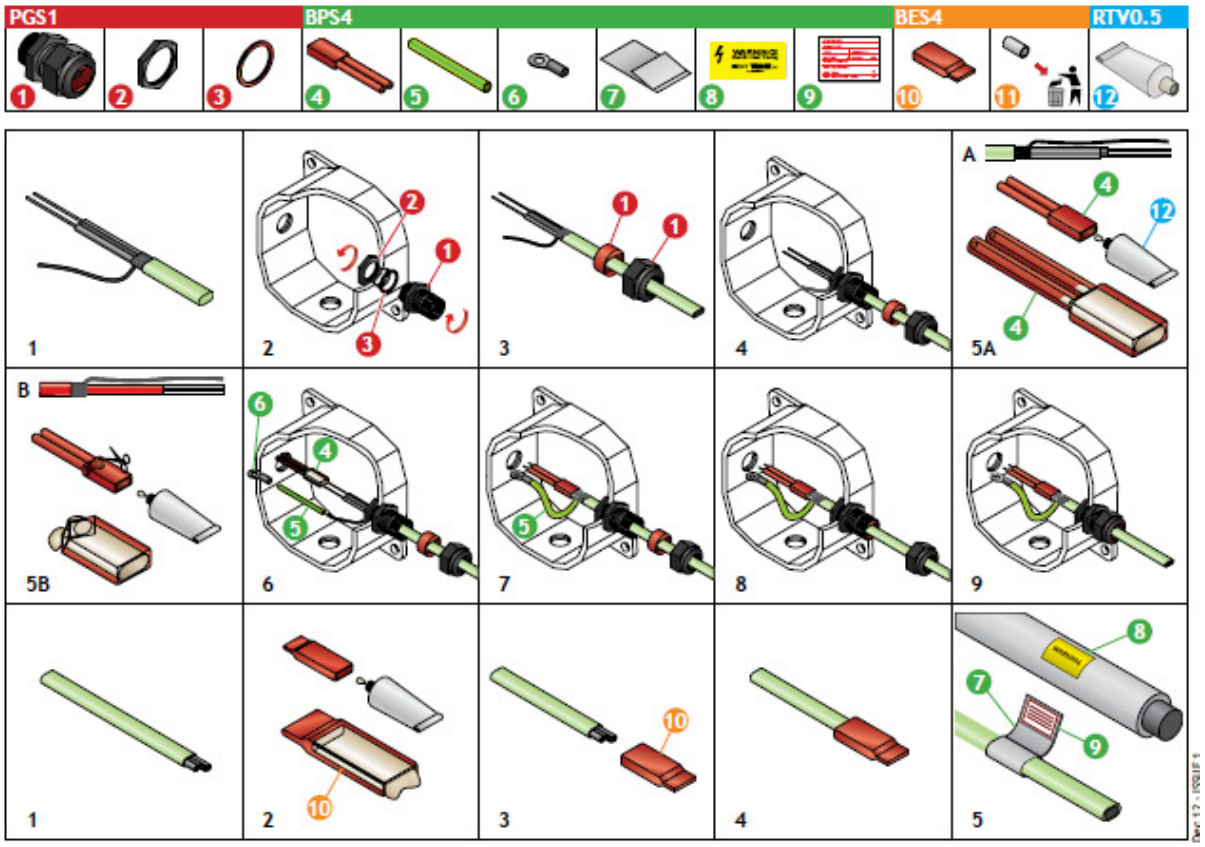
115V HEATING TAPE		230V HEATING TAPE	
277V	Multiply output by 5.80	277V	Multiply output by 1.45
230V	Multiply output by 4.00	240V	Multiply output by 1.09
208V	Multiply output by 3.27	220V	Multiply output by 0.91
120V	Multiply output by 1.09	208V	Multiply output by 0.82
110V	Multiply output by 0.91	115V	Multiply output by 0.25

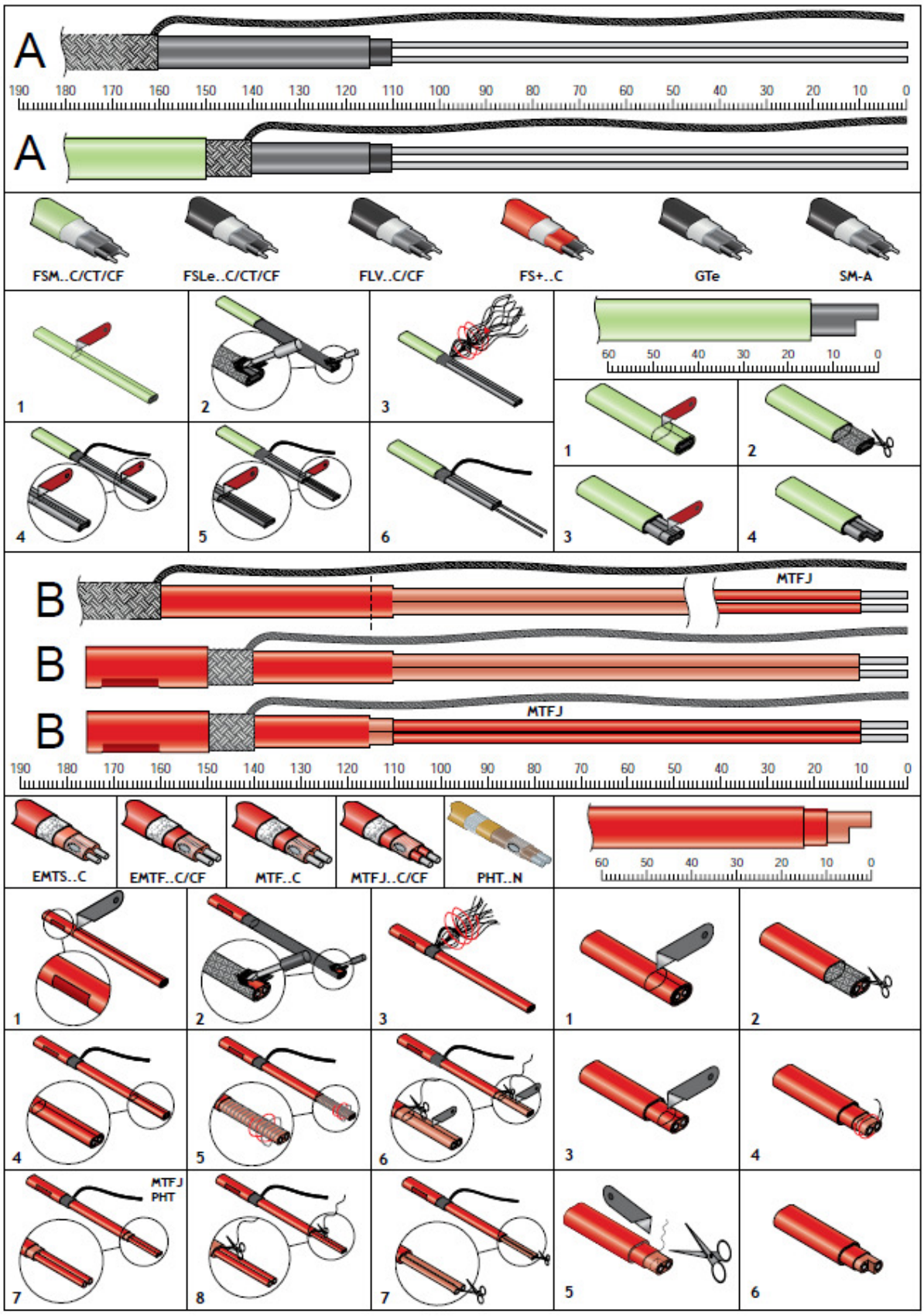
HEAT TRACE™
SETTING THE STANDARDS LEADING THE WAY
Mere's Edge, Chester Road, Helsby, Frodsham, Cheshire, WA6 6DL, UK
Tel: +44(0)1928 726456 Fax: +44(0)1928 727846 http://www.heat-trace.com

HPDS120 07/16

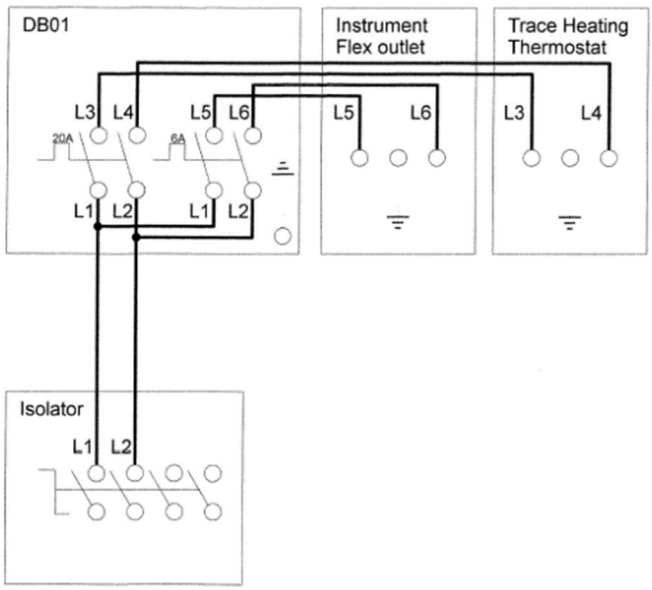
6.5.2 HEATED LINE INSTALLATION AND TERMINATION INSTRUCTIONS






A
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
A
FSM..C/CT/CF
FSLe..C/CT/CF
FLV..C/CF
FS+..C
GTe
SM-A
1
2
3
60 50 40 30 20 10 0
1
2
4
5
6
3
4
B
MTFJ
B
B
MTFJ
190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
EMTS..C
EMTF..C/CF
MTF..C
MTFJ..C/CF
PHT..N
60 50 40 30 20 10 0
1
2
3
1
2
4
5
6
3
4
MTFJ
PHT
7
8
7
5
6

6.7 CIRCUIT DIAGRAM



6.8 ELECTRICAL INSTALLATION CERTIFICATE

An electrical installation certificate and report is available on request for all kiosk installations, this covers only the actual kiosk installation and not any connection made to the kiosk by a 3d party.

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: Pump Low Error. Internal Pump Faulty.
- Fault# 10: Pump High Error. 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.

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.

8.0 BILL OF MATERIAL

8.1 COMPONENTS

Sub Assembly	Part	Part No.
OPTICAL BENCH	**FULL ASSEMBLY**	**100**
Optical Bench	detector collimating mirror	101
Optical Bench	IR Source block	102
Optical Bench	IR detector block	103
Optical Bench	IR detector box	104
Optical Bench	IR detector end plate	105
Optical Bench	IR sample cell end block	106
Optical Bench	IR cell tube centering plate	107
Optical Bench	IR cell tube "O" ring plate	108
Optical Bench	optical bench baseplate	109
Optical Bench	IR source	110
Optical Bench	Source mounting Socket	111
Optical Bench	pyroelectric sensor	112
Optical Bench	2.0 mm viton Gasket 25.6 x 12 x 2	113
Optical Bench	"O" ring viton 17.46 ODmm dia 2.62mm thick	114
Optical Bench	0.5mm Viton gasket 25.6 x 12 x 0.5	115
Optical Bench	1.00 mm Viton Gasket 25.6 x 12 x1	116
Optical Bench	filter	117
Optical Bench	CaF2 window 25mm D , 1mm thick	118
Optical Bench	shockmount	119
Optical Bench	gas cell tube	120
Optical Bench	SM Detector support PTFE	121
CASE	**FULL ASSEMBLY**	**200**
Case	Vero case 4U x 350	201
Case	Vero case 4U Front Panel	202
Case	Front Membrane PDF File: D620166 Issue 2	203
Case	Case Base machining	204
Case	Case rear and sides machining	205
Case	Case Front Panel Machining for membrane	206
Case	Case top cover	207
Case	SD Card Mount bracket	208
Case	PCB Shelf Bracket	209
Case	PCB Shelf	210
Case	PCB detector shield box	211
Case	PCB Mains Shield	212
Case	SD Card Reader clamp	213

Case	Pressure sensor clamp top	214
Case	Pressure sensor clamp bottom	215
Case	Feet	216
Case	Screen	217
Case	Screen Bezel	218
Case	Screen ZIF cable	219
Case	SD card Extender	220
Case	SD Card	221
Case	Mains Cable, Kettle Lead 10A 2M	222
Case	Mains kettle socket/switch 6A 110 or 240V	223
Case	Mains keetle socket boot	224
Case	FAN 60mm 31.8m3	225
Case	Fan Cover	226
Case	Injection Port Plug	227
Case	Bezel to Mcu Standoffs m4 x 10mm	228
Case	Shield standoffs m3 x 30mm	229
Case	PCB standoffs m3 x 8mm	230
BASE PLATE	**FULL ASSEMBLY**	**300**
Base Plate	pump, KNF (110V version N86KNE 110V)	301
Base Plate	pump shock mounts	302
Base Plate	back pressure relief V07-100-NNLG Conrad	303
Base Plate	forward pressure reg RO7-100-RNKG	304
Base Plate	mtg bracket and nut for items 10,11 NUT ONLY	305
Base Plate	Regulator mounting bracket	306
Base Plate	solenoid 3 way	307
Base Plate	1/8" OD, 1/16"ID PTFE tubing	308
Base Plate	1/8" OD, 0.7mm wall 316 st st tube	309
Base Plate	Power Supply EDA100-24, 24vdc , 4500mA	310
Base Plate	Capillary tubing 1/16 in. OD x .009 in. ID	311
Base Plate	Capillary	312
Base Plate	Capillary	313
CONCENTRATOR	**FULL ASSEMBLY**	**400**
Concentrator	concentrator side bracket	401
Concentrator	top concentrator heater block	402
Concentrator	bottom concentrator heater block	403
Concentrator	concentrator enclosure end panel	404
Concentrator	concentrator enclosure side panel	405
Concentrator	concentrator enclosure pillar	406
Concentrator	concentrator enclosure top plate	407
Concentrator	concentrator enclosure base plate	408
Concentrator	Exhaust Cowel	409
Concentrator	Thermal cutout Limitor mount	410
Concentrator	Cartridge Heater, 100 W, 120 V ac	411
Concentrator	Pt100 0.125"dia x .6" long 510 deg	412

Concentrator	Fan EBM Papst 614NGH	413
Concentrator	concentrator tube	414
Concentrator	sleeved grommet	415
Concentrator	thermal cutout	416
Concentrator	M3 x 40 hex spacer	417
Concentrator	Heater and PT100 clamping plate	418
PCBs	**FULL ASSEMBLY**	**500**
CH4 Sensor	CH4 Sensor	501
CH4 Socket	socket for sensor	502
Silox MCU PCB	MCU pcb populated	503
Mcu to Main Ribbon Connectors	10 way Recepticle ribbon connector	504
Main PCB	Main pcb populated	505
PERMEATION OVEN	**FULL ASSEMBLY**	**600**
Permeation Oven	oven block & top plate	601
Permeation Oven	insulating plate, base	602
Permeation Oven	" " ", front	603
Permeation Oven	" " ", back	604
Permeation Oven	" " ", side	605
Permeation Oven	" " ", side with cutout	606
Permeation Oven	Duratec insulator plate	607
Permeation Oven	heater, 50 W 240V, 6.5mm dia x 40 long	608
Permeation Oven	Pt100 4.8mm dia x 3.5mm	609
Permeation Oven	120 deg thermal cutout	610
Connectors	**ALL**	**700**
Connectors	Mini Fit Jr 2 Way	701
Connectors	Mini Fit Jr 4 Way	702
Connectors	Mini Fit Jr 3 Way	703
Connectors	terminal pins	704
KIOSK & Fittings	**ALL**	**800**
Flame arrestor	Flame Arrestor	801
Flame arrestor	Flame Arrestor Mount	802
Coalescing water trap	Headline 725PC filter assy inc coalescing filter	803
Coalescing water trap	Headline Coalescing filter	804
Coalescing water trap	Mounting bracket	805
Self Drain Water Trap	Auto drain pre built trap	806
Coalescing water trap	Headline 120-70CS filter assy inc coalescing filter	807
Enclosure	Fan	808
Enclosure	Thermostat -	809
Heated Line	Electrically heated line	810
Tubing	1/4"OD, 1/8" ID PTFE tubing £85.97 10M Coil	811
Tubing	1/4"OD, 1/8" ID PTFE tubing RED £20.63 Coil 30M	812
Tubing	1/4"OD, 1/8" ID PTFE tubing Yellow £17.42 Coil 30M	813
N2 Regulator Nozzle	Turned nozzle for regulator to Swagelok	814
N2 Reg Nipple Nut	1/2" Brass Nut	815

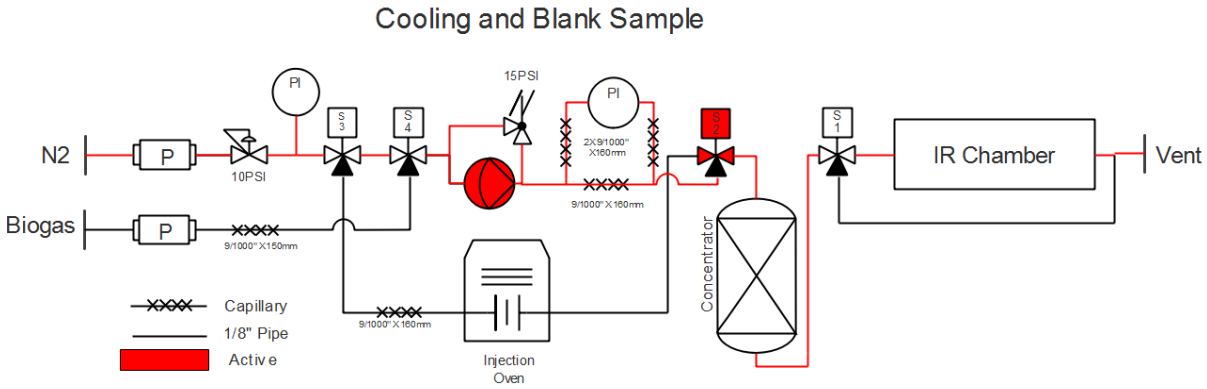
Regulator to 35mbar	BES PN 6291 + 6298	816
Regulator to 35mbar	35mbar spring	817
Ducting	5m length need 1M, £30 for 5M	818
Fan Spigot plates	instrument mounted	819
in/out	inlet/oulet ducting spigot plate	820
in/out	tube for spigot plate	821
Fan Plate	Aluminium blanking plate for Fan	822
Vent Plate	Aluminium Blanking plate for Vent	823
Plate marking guide	Driling guide for plate mounting	824
Anchor plates	Anchor plates to secure fan/vent plates	825
COMMS	4-20mA Connector - 12 way Blue Panel Socket	826
COMMS	4-20mA Connector -12 way Blue Plug	827
COMMS	4-20mA Connector - Dust Cap	828
Manifold & Switching	12 Way Connector -Red Panel Socket	829
Manifold & Switching	12 Way Connector -Red plug	830
Vent line	End of line Flame Arrestor, 1/2" BSP Female	831
Distribution box	12 way in - glands out, ABS Grey	832
Distribution box	Terminal block din rail 2 pos	833
Distribution box	Bridge	834
Distribution box	Terminal block end plates	835
Comms	GSM remote comms box, Metron 2	836
Kiosk Fittings	Enclosue back plate	837
Kiosk Fittings	Enclosue instrument shelf	838
Kiosk Fittings	Enclosue Regulator shelf	839
Kiosk Fittings	Coalescer Mounting Block	840
Kiosk Fittings	Solenoid Mounting Block	841
Kiosk Fittings	Biogas Pipe Clamp	842
Kiosk Fittings	Vent Pipe Clamp	843
Enclosure Bracket	90 degree angle iron ALU 25mmx25mm	844
Kiosk Fan Filter	120mm foam	845
Inlet/Outlet	Jubilee Clips	846
Cabinet	DRP Kiosk	847
Cabinet	Electrical Installation	848
Regulator	35mbar Regulator clamp plate	849

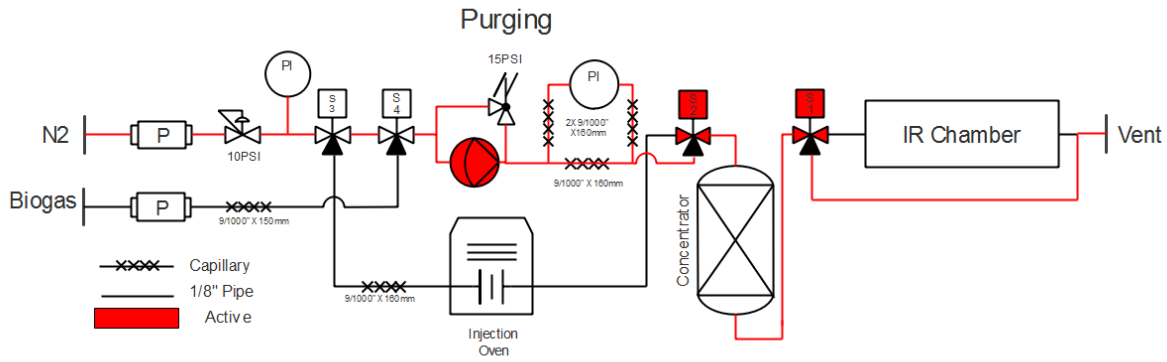
8.2 FITTINGS

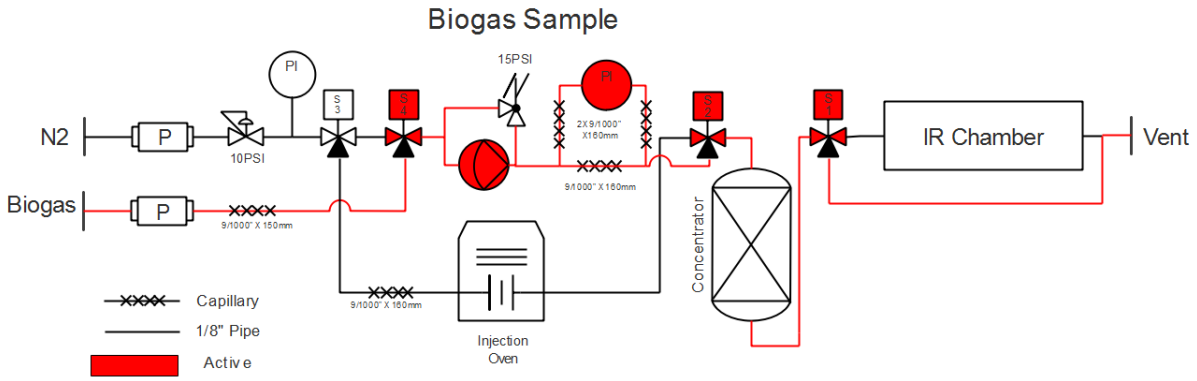
SWAGELOK FITTINGS	ALL	Part No
GAS CELL	1/8" BSPT ELBOW	SS-200-2-2RT
CONCENTRATOR	1/4" X 1/8" SLOK	SS-400-6-2
PUMP N86KNE	1/8 swlok Tee Union	SS-200-3
PUMP N86KNE	ADAPTOR 1/8 BSPP to 1/8 tube	SS-2-TA-1-2RS
VALVE NO 1	1/8 NPT ELBOW	SS-200-2-2
VALVE NO 2	1/8NPT ELBOW	SS-200-2-2
VALVE NO 2	1/8 NPT to 1/8 SLOK RUN TEE	SS-200-3TMT
VALVE NO 3	1/8 NPT ELBOW	SS-200-2-2
VALVE NO 4	1/8 NPT ELBOW	SS-200-2-2
Pressure Sensors	1/8 swlok Union	SS-200-6
Pressure Sensors	1/8 swlok Tee Union	SS-200-3
N2 REGULATOR	straight 1/8 SLOK TO 1/8 BSPP male	SS-200-1-2-RP
N2 REGULATOR	straight 1/8slok to 1/8 BSPT male	SS-200-1-2-RT
EXHAUST LINE	EQUAL 1/8 SLOK TEE	SS-200-3
EXHAUST LINE	BULKHEAD 1/4 slok to 1/8 slok	SS-400-61-2
BIOGAS Relief	STRAIGHT 1/8 SLOK TO 1/8 BSPP	SS-200-1-2RP
PERM OVEN	1/8 SLOK TO 1/8 NPT	SS-200-1-2
PERM OVEN	1/8 NPT to 1/8 SLOK RUN TEE	SS-200-3TMT
BIOGAS SUPPLY	BULKHEAD 1/4 slok to 1/8 slok	SS-400-61-2
BIOGAS SUPPLY	1/8 1/8 SLOK 2 MICRON FILTER	SS-2F-2
N2 SUPPLY	BULKHEAD 1/4 slok to 1/8 slok	SS-400-61-2
N2 SUPPLY	1/8 1/8 SLOK 2 MICRON FILTER	SS-2F-2
Bulkhead straight	Port Connector, 1/8 in. Tube OD	SS-201-PC
FLAME ARRESTOR	CONNECTOR 1/4 SLOK TO 1/4 BSP	SS-400-1-4RP
FLAME ARRESTOR	Washer, 1/4" BSPP copper gasket	CU-4-RP-2
BACK PANEL	1/4 BULKHEAD CLAMP	SS-402-61-F
Headline Filter	1/4" slok to 1/4" NPT	ss-400-1-4
Biogas Valve	1/4 turn shutoff valve 1/4"	SS-4P4T
Test Point	Union T 1/4" slok	SS-400-3
Multi sample line 4 way junction	1/4" Union Cross	SS-400-4
Test point plug	Plug with cable	SS-400-P-0010
Ferrules	1/8" front and back set	SS-200-SET
Ferrules	1/4" front and back set	SS-400-SET
Parallel Wahers	1/8 Copper	Cu-2-RP-2
Auto Drain Trap	1/2" BSPP to 1/4" Swagelok	SS-400-1-8RS
Auto Drain Trap	Washer 1/2" Copper	CU-8-RP-2
End of Line flame arrestor	1/2" BSPT Male to 1/4 Swagelok	SS-400-1-8RT

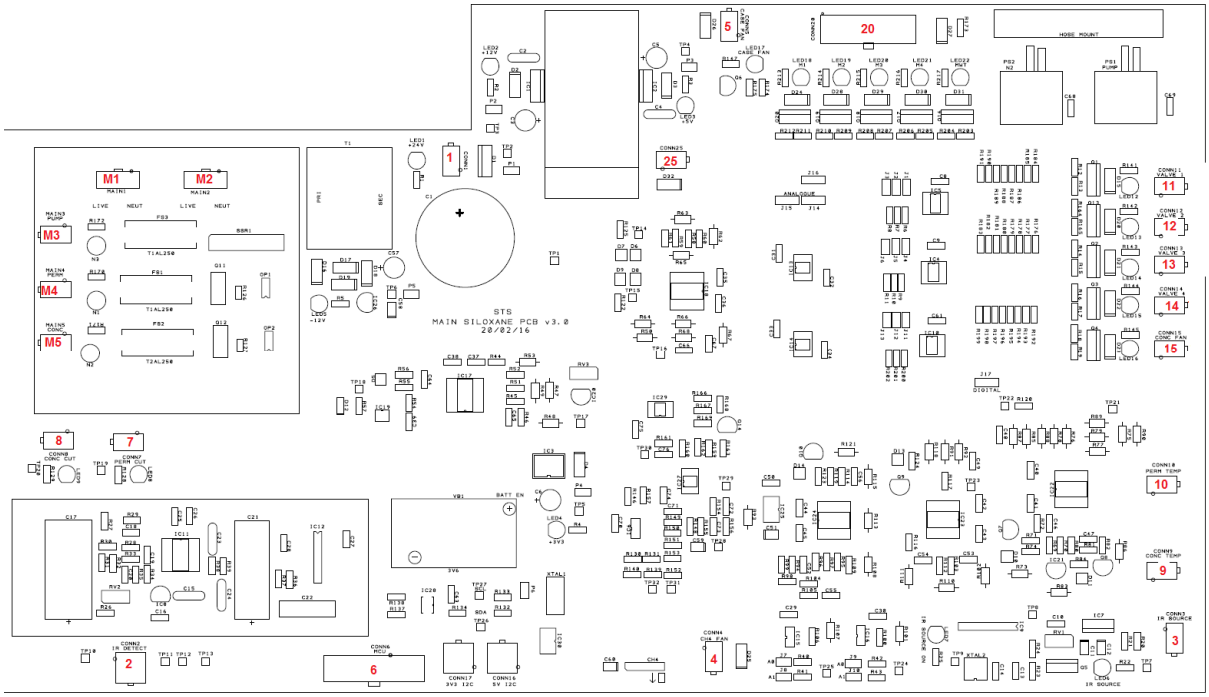
Kiosk Gas Regulator	1/2" BSPT Male to 1/4 Swagelok	SS-400-1-8RT
Sample line 1 switching Valve	Male 1/8 NPT elbow to 1/4 slok	SS-400-2-2
Sample line 2 switching Valve	1/4" Male Branch Tee to 1/8th NPT male	SS-400-3TTM
Sample line 3 switching Valve	1/4" Male Branch Tee to 1/8th NPT male	SS-400-3TTM
Sample line 1 switching Valve	straight male 1/4 slok to 1/8 male npt	SS-400-1-2
Sample line 2 switching Valve	straight male 1/4 slok to 1/8 male npt	SS-400-1-2
Sample line 3 switching Valve	straight male 1/4 slok to 1/8 male npt	SS-400-1-2
	Union Elbow 1/4"	SS-400-9
Pipe supports	1/4" pipe supports	MS-TSS-4

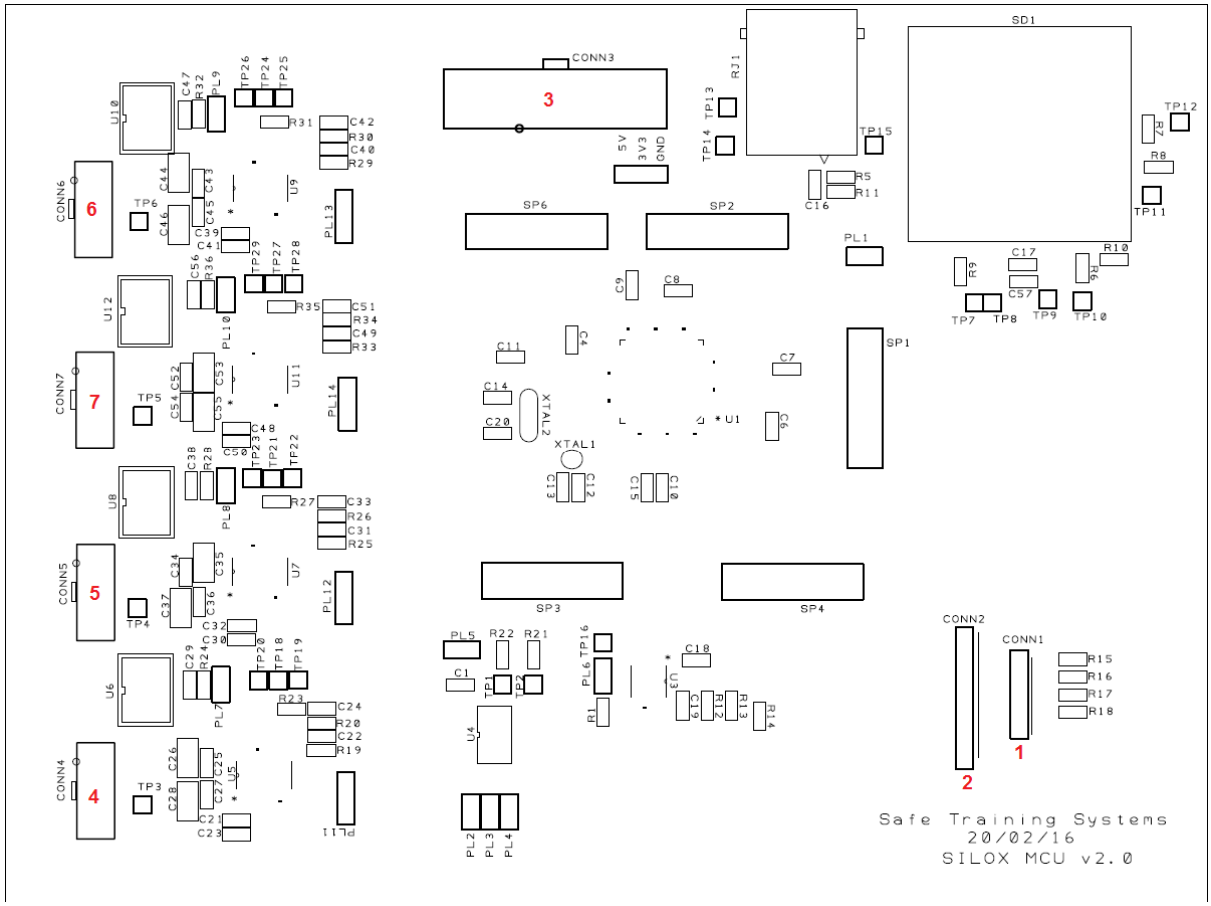
9.0 APPENDICES



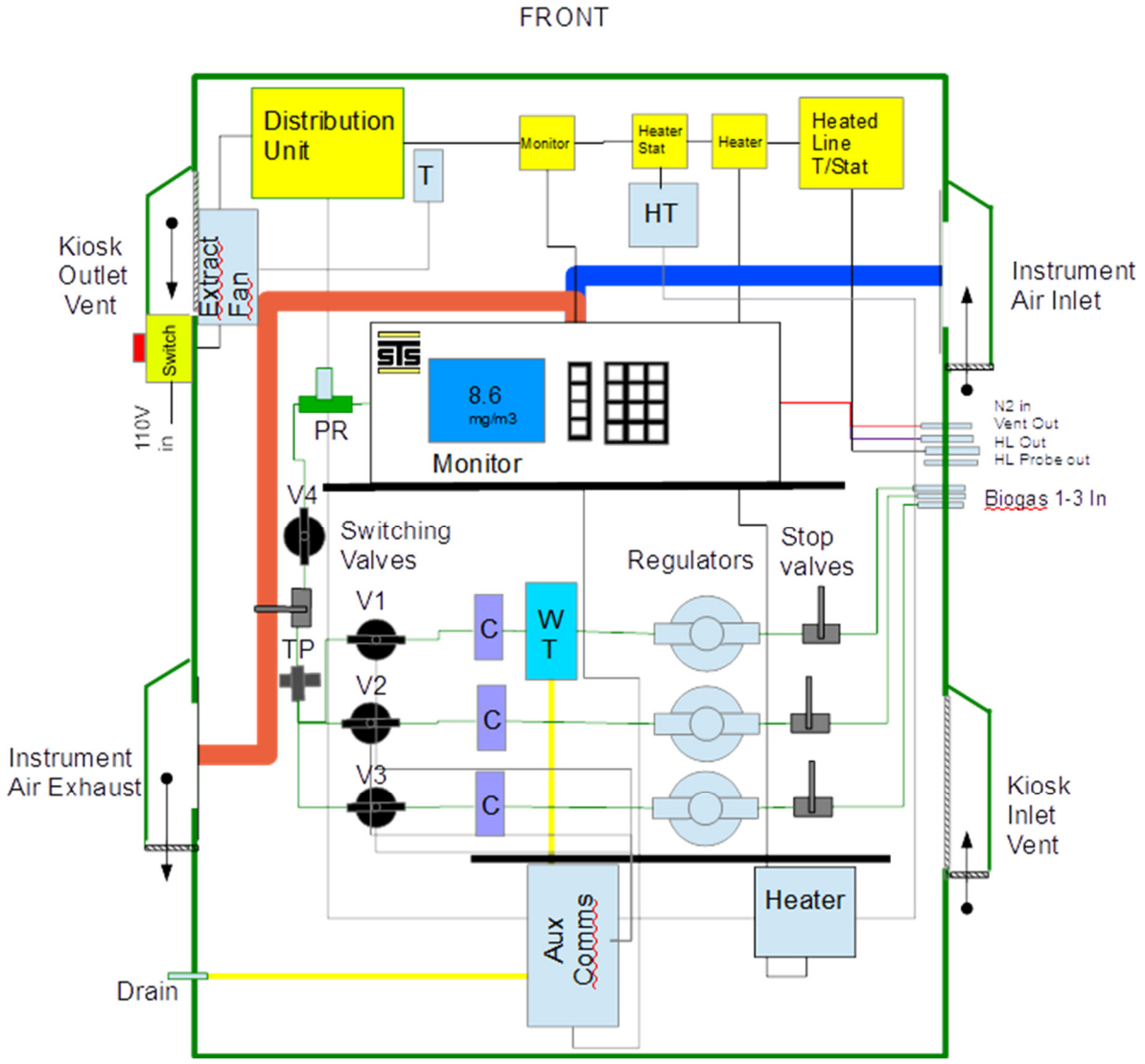




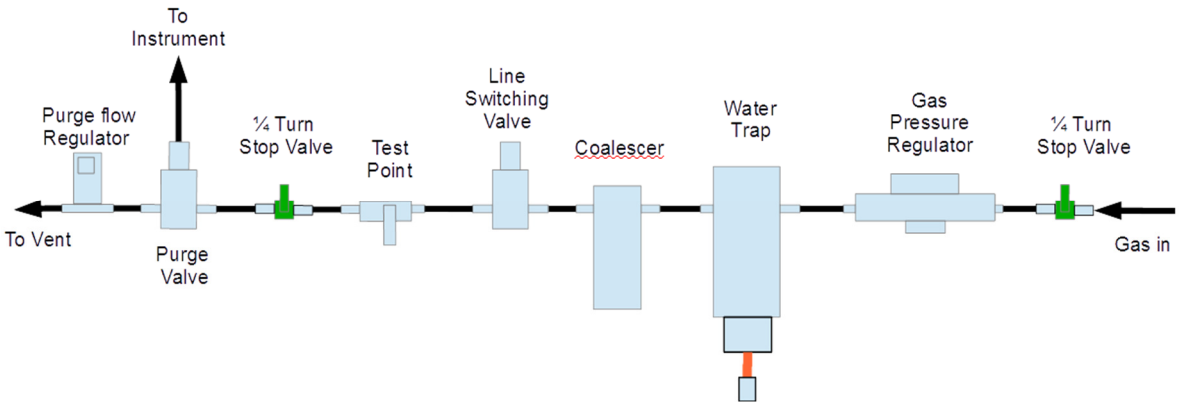

STS
MAIN SILOXANE PCB v3.0
20/02/16


CONN3
SD1
SP6
SP2
SP1
SP3
SP4
CONN2
CONN1
Safe Training Systems
20/02/16
SILOX MCU v2.0

Siloxane Monitor Kiosk Layout



Siloxane Gas flow path through kiosk – Pre-filter Sample



Siloxane Gas flow path through kiosk – Intermediate and Post-filter Sample