MECHATECH SYSTEMS TECHNICAL VACUUM SOLUTIONS

UK MANUFACTURERS OF THE LYOSCIENCE (LS) RANGE OF FREEZE DRYERS
& BESPOKE HIGH VACUUM SYSTEMS | VACUUM PUMPS - SPARES - SERVICE

S35 Multipurpose Gas Sampling System
INSTALLATION AND OPERATION MANUAL

PLEASE READ THIS DOCUMENT BEFORE OPERATING THE MACHINERY

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1. DOCUMENTATION RECORDS

Issue	Documentation Update Details	Date	Approval
1a	Project version 1a developed and issued for internal review	24/06/09	JH
1	First formal issue to customer.	25/06/09	JH

2. INTRODUCTION

2.1 Purpose

This manual provides installation and operation instructions for the Multipurpose Sampling Units for British Energy.

This manual and all accompanying documentation must be read before operating the system.

Important safety information is highlighted as WARNING and CAUTION instructions; you must obey these instructions. The use of WARNINGS and CAUTIONS are defined below.

2.2 General safety

WARNING: Warnings are given where failure to observe result in injury or death to persons. See Appendix for list of instruction manuals.

CAUTION: Cautions are given where failure to observe the instruction could result in damage to the equipment, associated equipment and process. Refer to the accompanying manufacturers instruction manuals for the technical data on individual components.
See Appendix for list of instruction manuals.

2.3 Unpack and inspect

CAUTION: Remove all packing material before operating system.

If the equipment is damaged notify your supplier and the carrier in writing within three days.

2.4 Installation and Commission

2.4.1 Initial setup

Ensure that the unit is positioned on a flat stable surface.
Check that the services meet the specifications listed below.
Ensure that all packaging is removed prior to connection.

2.4.2 Services requirements

Service	Requirement
Electrical supply	Single phase 110 volt 50Hz
Pneumatic supply	NA

CAUTION: The unit is factory configured for 110volts 50Hz, single phase supply. Check that your voltage supply is compatible. If you operate this unit on the wrong voltage, you will damage it.

2.4.3 Mechanical data

Maximum mass 40 Kgs

2.4.4 Additional Documents to be supplied

Eurotherm 2132i & 2116i controller installation and operation instructions.
Gems 562714 pressure transducer operating instructions.
Rockwell Automation solid state relay 700-SH installation instructions.
Tube Furnace TF1125 Reference Manual

3. OVERVIEW

3.1 General Description

Principle of operation.
Carbon dioxide is drawn from the sampling point at a controlled rate into a combustion furnace packed with quartz wool at 1000C. Any sulphur, carbon and hydrogen containing compound in the gas is oxidised by air, supplied continuously through a separate line, to produce sulphur dioxide, carbon dioxide and water respectively. The reaction products are then selectively absorbed into aqueous solutions of hydrogen peroxide and sodium hydroxide which are then analysed by appropriate radioactive counting techniques. For sampling air, the principle is the same except that a separate air line for oxidation is not required.

Description.
A line diagram is displayed on the front panel of the instrument showing the internal connections and sampling options that are available.
The sampling line for high pressure C02 incorporates a pressure reducer, a pressure gauge and on-off valve. For sampling low pressure C02 two options are available. The sample can be extracted using a pump, or, if there is sufficient pressure the pump can be by-passed by operating the appropriate on-off valves. If the pump is by-passed, it must be switched off.
A second pump is used to supply air to the system for oxidation. If all valves in the C02 lines are placed in the closed position, the unit can also be used to sample air. The valve in the air line, which normally is set to by-pass the gas meter, should be turned to the opposite direction, so that the volume of air sampled can be measured.
After passing through the furnace the gas is bubbled through the absorbing solutions contained in the bubblers and then flows to waste.
Flow rates for air and C02 are controlled by two needle valves connected to flow meters; the total quantity of C02 or air sampled is measured by the gas meter. The temperature and pressure of the sampled gas, as its volume flow rate is measured, is displayed on the front panel indicators.

4. FUNCTIONS

4.1 Power up

Power up is achieved via the pump and furnace switches situated on the front panel.

4.2 Modes of Operation

4.2.1 Initial start up

- Ensure that the power is on.
- Press the start switches.
- The furnace should be allowed heat up; a period of 2 hours is suggested.

4.2.2 Operating notes

- The power supply used by the monitor is 110 volt 50Hz.
- The unit is operated by pressing downwards the appropriate pump switches and the furnace switch which are located on the front panel.
- The temperature for the furnace is normally set at 1000C. The furnace should be allowed to slowly heat up from cold in order to conserve the heater windings. A heat up period of 2 hours is recommended.
- If sampling is carried out at high rates for long periods, there will be an evaporation loss from the bubblers and they may require topping up at intervals Suggested flow rates are 2 litres/minute for C02 and 1 litre/minute for air.
- The air pump should not be run with the needle valve on the flow meter closed, as this may cause overheating.
- The pump in the low pressure C02 line should not be run when the valves in the inlet and outlet lines are in the closed position, as this may cause overheating.
- Disconnect bubblers before the furnace is switched off. This will ensure that transference will not occur due to gas contraction on cooling.

5. MAINTENANCE

WARNING: There is no safety interlock fitted. Ensure that the electrical supply is isolated before starting any maintenance work.

5.1 Manufacturers literature

Manufacturers' literatures for all major components have been included.

6. SPARES AND ACCESSORIES

Description	Part No	Supplier
1200₀C 110v Furnace	S35-01A	MECHATECH SYSTEMS MechaTech Systems Ltd Unit 9 Brunel Way Thornbury Bristol BS35 3UR +44 (0)1454 414723 enquiries@mechatechsystems.co.uk www.mechatechsystems.co.uk
Thermocouple for S35-01A Furnace	S35-03	
Silica Reaction Tube	S35-07	
Multi - purpose sampler bubbler complete	S35-17A	
Furnace tube assembly	S35-42	
Head and Stem with ground diffuser	S35-47B	
Quartz Wool (10g pack)	C004	

For a full spares list or for servicing of the S35 gas sampling unit, please contact MechaTech System Ltd.