sercon
innovators in isotopes

Pre-Installation Guide
HS2022



S194_V1

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2. Introduction

This pre-installation guide is issued to help users prepare a site for the installation of Sercon instruments prior to the arrival of the installation engineer on site. The guide gives details of the system's bench space, electrical, environmental and gas requirements. Observing the site requirements will avoid delays during installation.

When all the requirements have been met, please complete and return the pre-installation survey to Sercon and an installation date will be confirmed.

3. Bench space

The table below gives the dimensions and weight of the HS2022, and inlets which may be associated

System	Width	Height	Depth	Weight
HS2022	820 mm	800 mm	610 mm	120 kg
EA	820 mm	800 mm	700 mm	100 kg
PyroEarth	820 mm	800 mm	700 mm	105kg
HT-EA	600 mm	570 mm	700 mm	80kg
GC	580 mm	500 mm	540 mm	50 kg
Orchid	500 mm	600 mm	570 mm	20 kg
Furnace controller	400 mm	400 mm	400 mm	20kg
Cryo Range	820 mm	550 mm	590mm	110 kg
µCarbs	720 mm	800 mm	600mm	100 kg
Aqua	720mm	800 mm	600mm	100 kg

The bench needs to be sturdy to support the weights shown above. Access to the back of the units is required, so please ensure that the benches are not against the walls. A minimum clearance of 50cm is required at the back of unit.

Additional space is required for the PC, monitor and printer.

4. Power Requirements

All mass spectrometers require a clean, stable source of power.

The system should be connected to a separate single-phase, continuous duty, 220-240 VAC, 48-62 Hz power line, with a maximum break of 10 ms. 1500 VA minimum service is required for the system.

110V compatible instruments can also be supplied.

In the case of a differing mains voltage, a transformer must be used.

Summary of power requirements of the HS2022, and inlets which may be associated:

For Manual Conversion of Power Dissipation to Required Air Conditioning BTU/hour capacity use:

$$P_{(BTU/hr)} = 3.41 \times P_{Watts}$$

To Convert from Power in VA to Watts:

$$P_{Watts} = VA \times Power\ Factor$$

Assume a Power Factor of 1 for our systems. This may vary for instruments with a transformer; in those cases the power factor will be <1 (typically around 0.9 or 0.8) as the load is predominantly inductive.

System	Power	BTU/hr	Power Point
HS2022	0.8 kVA	2729.71	1
PyroEArth	3.6 kVA	12283.71	1*
EA	1.5 kVA	5118.21	1
HT-EA	3.0 kVA	10236.42	1*
GC	3.0 kVA	10236.42	1
Orchid	1.0 kVA	3412.14	1
Furnace controller	0.8 kVA	2729.71	1
Cryo Range	0.8 kVA	2729.71	1
µCarbs	2.5 kVA	8530.35	2
Aqua	2.5 kVA	8530.35	2

16A power supply.



In situations where power breaks may exceed 10 milliseconds, a UPS is required. A UPS also helps to smooth out the power supply if it is not particularly stable. Please contact Sercon for information on suitable UPS units.

5. Environmental Requirements

5.1 Room temperature

The permissible temperature range is 17°C - 30°C.

Approximately 20°C is preferable with temperature variations of less than ±2 °C/ hour.

5.2 Humidity

The relative humidity must not be lower than 20% and not exceed 70% at any temperature.

The optimum relative humidity level is 40%-60%.

5.3 Air conditioning

We recommend the installation of air conditioning, if the specified limits will be frequently exceeded on account of unfavourable climatic conditions. Direct sunlight on the system should be avoided.

Please ensure that the air-conditioning unit is not blowing across the electromagnet.

6. Gases

The system requires gas cylinder connections with 1/8” compression fittings (Swagelok or similar) and 1/8” diameter GC grade stainless steel or copper tubing for all gases (except the compressed air). The length of the tubing will be entirely dependent upon where your gas bottles are located in the lab. This should ideally be kept to a minimum. Standard 2-stage regulators that are capable of delivering a pressure of at least 3.5 Bar are required.

A 1/8" Swagelok Tee Union is required for splitting the helium (and hydrogen for the GC, if used). Additional Tee unions are needed to split the helium for additional inlets, unless connections are provided on the bench for each one.

Helium

Carrier gas. 99.998% with 10vpm or less of N_2.

A large (10 m^3) cylinder should last at least 6 weeks.

Oxygen

Required for combustion and re-oxidising catalysts in some inlets.

99.998% with 0.5 - 5vpm or less of N_2.

A large (10 m^3) cylinder should last several years under normal operating conditions.

Reference Gases

The HS2022 mass spectrometer is fitted with a reference gas injector system. Appropriate reference gases should be available for the samples you are interested in - CO_2, N_2, H_2, etc. These should be of high purity – 99.99%. Please check the Gas Requirement Check List at the end of this document

Compressed Air

A compressed air supply of 50 – 60 psi (approx. 3.5 Bar) is needed for pneumatic solenoid operations. This can be from a compressor or gas bottle. Alternatively, the valves can be operated using the helium supply but this will increase helium consumption. The compressed air is connected to the instruments by 1/8" nylon tubing.

For additional inlet-specific gases please see the Gas Requirement Check List at the end of this document

7. Installation and Service

7.1 Instrument Arrival

When the instrument arrives, please make an immediate visual inspection for damage. If any damage is apparent, please take the following steps:

- Note the nature and extent of the damage, including photographs

- Request an inspection and written damage report from a representative of the carrier to signify their concurrence with your observation.
- Contact Sercon and report the damage.

Caution:

Damage discovered 15 days after delivery of the equipment generally cannot be recovered. Such damage will be at the expense of the customer.

If the delivery receipt indicates that material has been received in apparent good order and condition and no exceptions are taken, Sercon will not accept liability for damage

7.2 Moving the equipment

Do not drop or mishandle the shipping containers. The equipment should be left in the shipping crates and, upon delivery, be taken by a forklift or a hydraulic pallet mover to the installation site.

7.3 Installation

When the instrument is on site and ready for installation, please contact Sercon who will arrange for an engineer to install it if arrangements have not already been made.

During the installation, the engineer will train the customer in the fundamentals of mass spectrometer operation and routine maintenance as well as application and software training. To receive maximum benefit from this onsite training opportunity, the instrument operator(s) should be available during the entire installation.

Additional training courses are available at our factory - please contact us for details.

8. Reference Materials

The HS2022 measures stable isotope abundances in your samples and compares them to reference materials of known isotopic composition. We suggest that you obtain a variety of suitable working reference materials, which can then be used to calibrate your instrument.

An effective reference compound is one that closely matches your samples in both elemental composition and isotopic enrichment.

Sercon is a supplier of reference materials. Please see https://serconlimited.com/sercon_systems/standards/

9. Consumables for Elemental Analyser Systems

New systems are supplied with appropriate start-up kits to allow system specification tests during installation. Further consumable supplies are available from Sercon. Please contact consumables@sercongroup.com or browse our online catalogue at sercon-consumables.com

10. Pre-Installation Survey

To ensure an efficient, trouble-free, installation of your Sercon instrument, could you please complete the attached questionnaire.

Simply answer each of these brief questions to confirm compliance with the pre-installation requirements, and return to service@sercongroup.com

Pre-Installation Guide HS2022

Pre-Installation Checklist

1. Bench and storage space is sufficient ☑
2. Main power 110V or 220-240V ☑
3. There are enough electricity plugs for the system ☑
4. Room temperature and humidity is adequate ☑
5. Gases, regulators & connecting tubing are on site ☑
6. All relevant safety precautions are complied with ☑
7. Sercon instrument has arrived on site ☐
8. Sercon instrument has been inspected for shipping damage ☐
9. System moved to installation site ☐

Gas Requirement Check List for Sercon Instruments

Please check you have all of the required gases necessary for analysis using the table for the inlets you have ordered.

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Gas	Grade	Use	
HS2022			
Helium	99.998	Carrier	☑
Nitrogen	99.999	Tuning / Stability / ref gas	☐
Carbon dioxide	99.999	Tuning / Stability / ref gas	☐
Hydrogen	99.999	Tuning / Stability / ref gas	☐
PyroEArth			
Helium	99.998	Carrier	☐
Oxygen	99.998	Combustion	☐
Compressed Air		Solenoid Operation	☐
EA			
Helium	99.998	Carrier	☑
Oxygen	99.998	Combustion	☑
Compressed Air		Solenoid Operation	☑
HT-EA			
Helium	99.998	Carrier	☐
Compressed Air		Solenoid Operation	☐
GC-CP			
Helium	99.998	Carrier	☐
Oxygen	99.998	Oxidation of combustion tube	☐
Synthetic Air [Zero Grade]	20% O_2 /80% N_2	Flame Ionization Detector	☐
Hydrogen	99.999	Flame Ionization Detector	☐
Liquid Nitrogen		If N_2 combustion option selected	☐
Cryo Range			
Helium	99.998	Carrier	☐
Oxygen	99.998	Oxidation of combustion tube	☐
Liquid Nitrogen		For sample preparation	☐
µCarbs* **			
Helium	99.998	Carrier	☐
Aqua			
Helium	99.998	Carrier	☐
Carbon dioxide	99.999	Equilibration Gas**	☐
Hydrogen	99.999	Equilibration Gas**	☐

*** Phosphoric acid is required for carbonate / DIC measurements

**Pure H_2 and CO_2 can be used for the equilibration of water samples but may affect the results of smaller water samples (<100µL). 5% gases (i.e. 5% H_2 or CO_2 in helium) are preferable for smaller samples and give

more manageable sample sizes in general. The use of 5% gases is recommended but is at the customer's discretion.



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Contact Name:	Kirsten Butcher	
Customer Name:	Kirsten Butcher	
Address:	Bolley Agricultural Laboratory	
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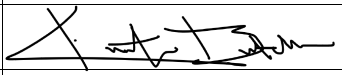
1650 18th St N		
Fargo, ND 58105		
Tel No:	314.580.3704	Email: kirsten.butcher@ndsu.edu
Fax:		
Date of delivery:	26.10.26 (Estimated)	
Customer Signature		
Date:	17.09.26	

Please return to service@sercongroup.com

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