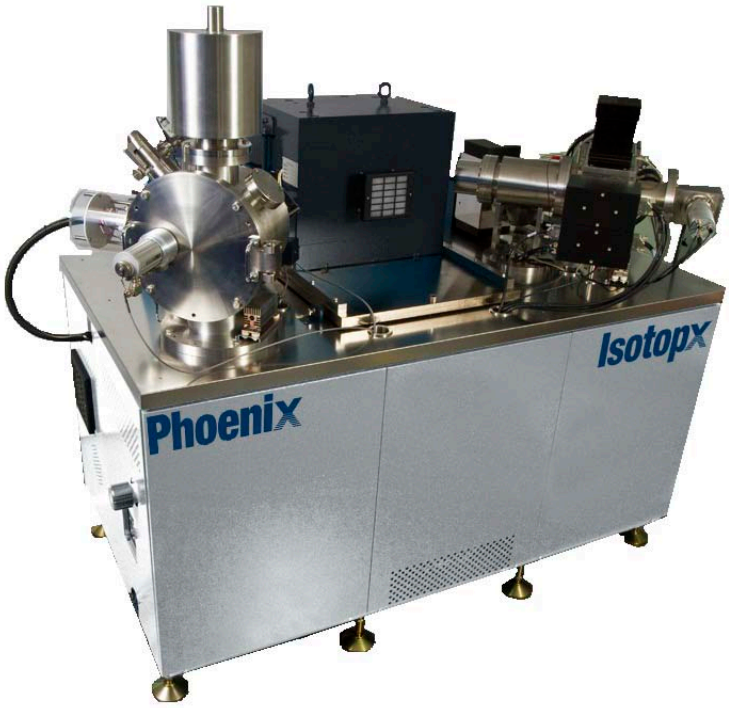
Isotopx

Excellence in mass spectrometry

Site Planning Guide Aug 2011



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1. Introduction

The purpose of this document is to provide users with specific information regarding the instrument requirements to allow adequate site preparation. This site planning guide will enable our users to prepare their laboratory with the necessary services and minimise any possible delays. The Phoenix is a high precision electronic instrument whose performance can be greatly affected by its operating environment, thus time and effort spent in preparing the laboratory facilities will contribute to the long-term performance of the instrument. In order to obtain the highest degree of productivity and performance with your instrument and MassLynx, technical support is available to assist in basic instruction and troubleshooting. To assist you in this regard, we highly recommend the installation of a telephone next to your instrument. Should you wish to discuss the site preparation in further detail, please contact Isotopx Limited or your local Isotopx sales and service organisation.

Site Layout

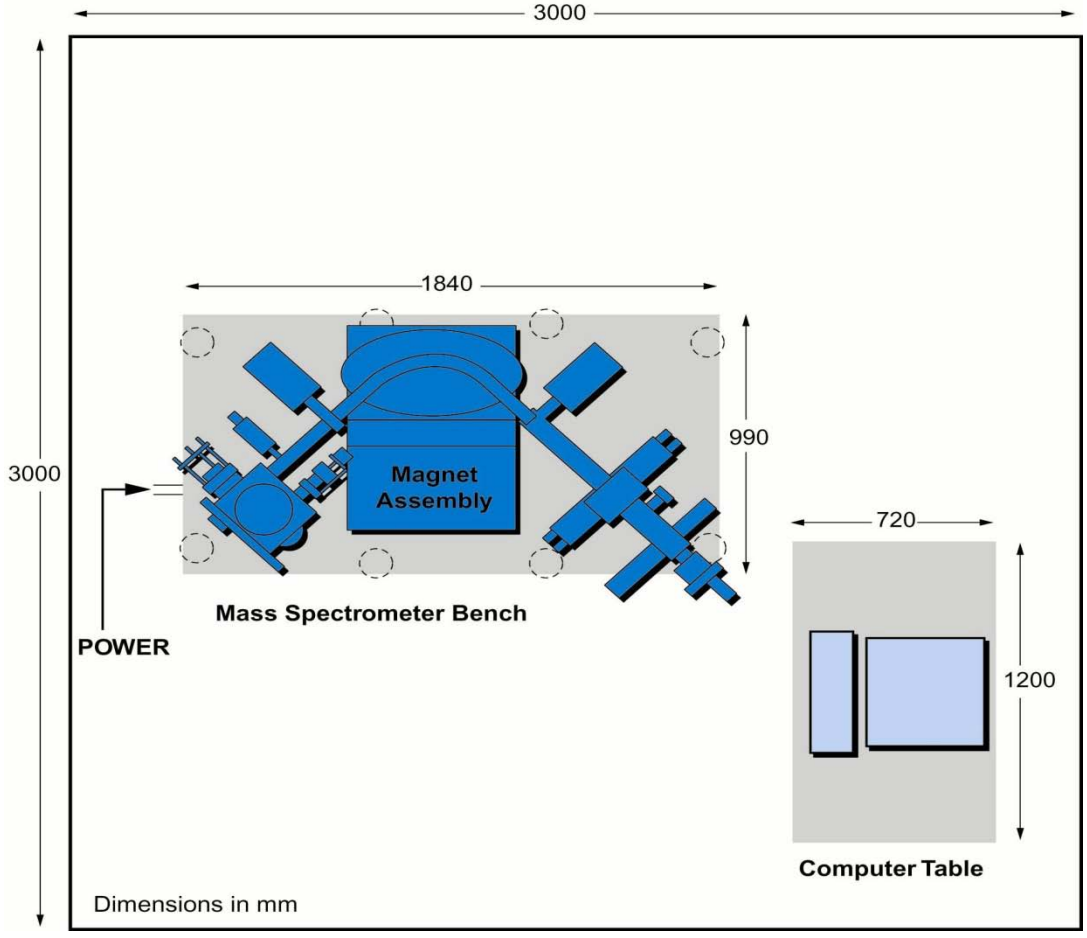

Figure 1: Phoenix Layout

Floor space

The dimensions of the instrument and the minimum floor space required for installation are shown in Figure 1. As a rough guide, a space, which is flat, free from vibration, and capable of withstanding a load of 2000kg, should be provided. This space should be a minimum of

3m × 3m. The height of the instrument is almost 1800mm, to the top of the cold trap. To fill the cold trap safely a further 1000mm has to be allowed.

Accessibility

The Mass Spectrometer Bench is fitted with castors for easy positioning. Power cables and data system cables can enter the bench at either end of the instrument. Figure 1 illustrates the power cable entering at the source end.

Lifting equipment

The combined weight of the bench and magnet can be as much as 1581 kg, dependent on instrument options. (The exact weight for a specific instrument can be provided from Packing List details as supplied on delivery.) The bench weight, with magnet, is distributed equally over 8 castors. If the floor is not immediately capable of with standing such an added load, then a steel base plate spanning floor beams may be required.

The magnet weighs of 574kg. An 'A' frame is recommended to lift the magnet (using the two lifting eyelets supplied) to a height of 1.4 metres from the floor to the bottom of the magnet or 2 metres from the floor to the top of the magnet. This will allow the magnet to be safely positioned onto the magnet bench.

The instrument may be lifted if necessary, with the magnet removed and with great care, using a fork lift truck under the main bench.

2. Services Required

Electrical Power

A clean power supply is required rated at 30 amps at 240-252V ac ± 5%, 50/60Hz.

Alternatively a 3 phase 4 wire + earth supply, rated at 20A/phase at 400Vac phase to phase (240V ac phase to neutral) may be used. Under these conditions the instrument presents an unbalanced load.

Neutral to earth voltage should not exceed 2V ac.

If the laboratory supply does not meet these specifications, a 6.5 KVA isolation transformer must be provided for correct operation of the instrument. Under normal operating conditions the power consumption is approximately 2.5kW increasing to 4.1kW when baking.

A 5m length of power cable is supplied by Isotopx for the instrument to connect to the customer's electrical supply. The cable should not be reduced in length during installation.

The electrical supply must be equipped with a switch or circuit breaker as a means of disconnecting the equipment. The switch should be in close proximity to the equipment within easy reach of the operator. It should be marked as the disconnecting device for the equipment. The means of disconnection should disconnect all current carrying conductors including the neutral line.

A voltage stabiliser may be used if required. Where supply interruption is common an uninterrupted power supply (UPS) should be fitted.

A transformer wiring diagram to convert a 208Vac supply to 240Vac for single phase outputs is shown in **figure 2.**

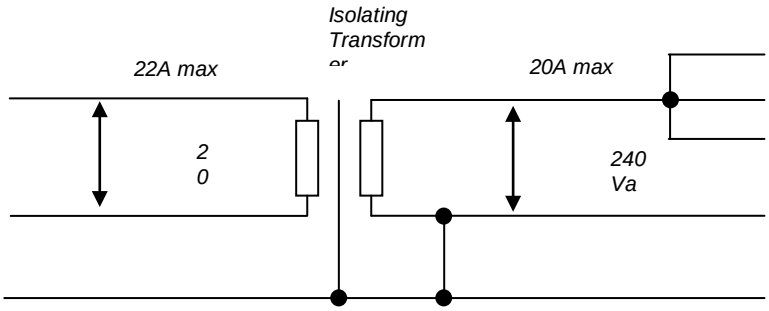

Figure 2: Isolating Transformer

Compressed Air

A compressed air supply of a minimum of 4 bar (60psi) is required to operate the pneumatic line-of-sight valve. The instrument is fitted with an internal gas pressure regulator for this function. N.B. Compressed air is not to be used as the vent gas, see below.

The compressed air line connection to the mass spectrometer must be 6mm outer diameter and preferably made from nylon.

Liquid Nitrogen

Liquid Nitrogen should be readily available at all times. The 24 hour cold trap holds approximately 2.5 -3 litres of Liquid Nitrogen.

Dry Nitrogen Gas

Dry nitrogen gas needs to be installed so that the instrument can be vented to an oil-free, dry gas. The pressure that is required for the correct operation of the vent valve is 10psi. The instrument is fitted with an internal gas pressure regulator for this function. Thus the instrument can be kept free from moisture and oil vapour when venting. Dry Nitrogen is preferred to dry argon as the ion pumps can pump nitrogen more efficiently.

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3. Environmental requirements

Safe Operating Conditions

The equipment is designed to be safe under the following conditions:

- Indoor use
- Altitude up to 2000m
- Temperature 5°C to 40°C
- Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C
- Mains supply fluctuations not to exceed ±10% of the nominal voltage;
- Transient overvoltages according to installation (overvoltage) category II;
- Pollution degree 2 in accordance with IEC664.

Note that these parameters are not optimum operating conditions for the instrument.

Room Temperature

For optimum performance the Phoenix should be located in a draft free, air conditioned room with a temperature stabilised to ± 1C° in the range 18°C - 22°C. The heat dissipation during normal operation is approximately 2.5kW, increasing to 4.1kW during baking.

The Decabin, housing the collector Faraday amplifiers, should be shielded from strong sunlight to avoid introducing calibration errors.

The maximum rate of change of temperature should not exceed 0.2^{o}C/hour.

Vibration

The floor vibration should be as follows:

$$\text{movement (pk/pk)} \leq \frac{100(4 + f^2)}{(1000 + f^2)} \ \mu m$$

where f is frequency of vibration in Hz

Floor vibration must be less than:

0.5 μm peak to peak movement at	1 Hz frequency
1.3 μm peak to peak movement at	3 Hz frequency
10 μm peak to peak movement at	10 Hz frequency
50 μm peak to peak movement at	30 Hz frequency
90 μm peak to peak movement at	100 Hz frequency

Note: When floor vibrations are measured before installation of the mass spectrometer, they may in some instances indicate up to twice the maximum levels shown above, since the peak to peak movements can reduce once the instrument is in position.

Dust free environment

A filtered dust free environment is recommended. Dust particles can also block air filters on the instrument and may cause overheating if not cleaned regularly.

Magnetic fields

The instrument should be positioned away from strong external AC or DC magnetic fields such as those, which may be generated by power or transmission lines, transformers or other scientific equipment.

Gamma and x-rays

If Ion Counting is fitted to the instrument we strongly recommend that efforts should be made to locate the instrument away from Gamma and x-ray sources as they can contribute to background counts.

Radio emissions

The use of radio devices emitting strong RF fields in the vicinity of the system should be avoided. Possible sources of RF emission include RF linked alarm systems or LANs, portable telephones and hand held transmitters.

4. Sample Solutions

Customers must supply the certified test solutions which will be used during installation.

Typical standards (with required concentrations) are as follows:

Sr NBS 987	= 2μg/μl
Nd La Jolla or JNdi-1	= 150ng/μl
NBS U500	= 2μg/μl
NBS U005 or NBS U010	= 2μg/μl
Pb NBS 981	= 1μg/μl
Pb NBS 983	= 1μg/μl

Adequate sample loading facilities should be made available to the installation engineer, ideally consisting of:

Single or multiple sample loading device.
Lamina hood/cabinet.

5. Installation Procedure

To ensure that the instrument is properly installed and fully operational, an engineer from the factory will be responsible for installing and commissioning the system.

The major part of your acceptance of the system is to take part in a series of test procedures designed to evaluate the performance under known operating conditions. At the end of each acceptance specification you will be asked to enter the achieved performance into the record and to sign your initials as a witness.

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During this time the intended operator will, by taking part in these tests, be trained in the operation of the system and the associated accessories. The benefit of this training should not be underestimated.

It is very important that the operator and the person who will witness the system performance specifications are available for the duration of the installation. If there are foreseen occasions when they cannot be present for an extended period (e.g. vacation) please notify us in advance. This will enable us to plan our time and your installation optimally.

Upon successful completion of these acceptance specifications the instrument will pass into the warranty period as defined in your purchase agreement. Routine maintenance arising from normal use of the instrument is not covered by this warranty and should be carried out by the user.

6. Installation Checklist

The following pages contain a checklist used to confirm that the laboratory is prepared and available to take receipt of your instrument.

Please complete this form and email to service@isotopx.com

In the event of a query concerning any aspect of the site requirements please contact your sales representative.

The installation of the instrument cannot be scheduled until this form is completed and returned to Isotopx.

7. Contact Information

UK Factory
Isotopx Limited
Unit 1A Millbrook Court
Midpoint 18
Middlewich, Cheshire CW10 0GE
UK
Phone 44-1606 839810
Fax 44-1606 839811
service@isotopx.com

US Office
Laurie Lischer
Isotopx Inc
93 Old Farm Road
Mansfield MA 02048
Phone 508-337-TIMS (8467)
Fax 508-337-8469
Cell 603-438-1932
Laurie.lischer@isotopx.co.uk

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Please complete the following pages and email to service@isotopx.com
(Feel free to type your responses directly into this document)

Instrument Serial Number: HCT _ _ _

8. Customer Contact Details :

Name:

Position:

Address:

City:

Postal code/ZIP:

Country:

Telephone:

Fax:

Email:

9. Installation Check list

Please type answers in RED below.

Room Size

1. Is the overall room size adequate to house the instrument (see page 2)?

Access

2. Is site accessible suitable for any size of vehicle?
3. If not, please describe the restriction:
4. Is there a raised loading bay?
5. Are there any time restrictions to unload?
6. Can the delivery vehicle park on site at any time?
7. If unloading has to be done on a public road, are there any parking restrictions?
8. If parking restrictions exist, can a permit be obtained?
9. Do you require the driver's name, passport, company or vehicle registration?
10. Is the instrument being placed in storage?
11. Please indicate on which floor of the building the instrument must be delivered
12. Can the building floor in the instrument's path be easily damaged? If so please describe e.g tiled, carpet, timber, linoleum etc:

13. Are all elevators, staircases, corridors and doorways through which the instrument must pass adequate to allow easy access to the laboratory?
14. If not, will building structures such as walls or doors be removed to facilitate access?
15. Will the instrument have to go over any stairs, steps, slope or other obstacle?
16. Can the instrument be positioned in the laboratory immediately upon delivery?
17. Will an 'A' frame, capable of supporting the magnet (800kg) be available on site?
18. Will a suitable fork lift truck be available if no 'A' frame is available?
19. Will a pallet truck be available?
20. Will a rigging company be involved?
21. If so, is the company in question insured?

Please provide any relevant additional information that would help us achieve a smooth, trouble-free delivery.

Power Supply

22. Has the appropriate power supply been installed and tested as fully operational?

23. If so, then please confirm the following parameters :

Live line phase with respect to earth (volts)	:
Neutral phase with respect to earth (volts)	:
Neutral with respect to live (volts)	:
Current rating of supply (amps)	:
Frequency of supply (hertz)	:

Floor strength

24. Is the floor strength adequate to meet the stated loading?

Floor Vibration

25. Is the designated instrument area known to be free from vibration?

Temperature

26. Is the room temperature within the stated limits?

Environment

27. Has air conditioning been installed for the instrument?
28. Is the humidity within the stated limits?

Magnetic Fields

29. Is the proposed instrument location known to be free from magnetic fields?

Radio Emissions

30. Is the field strength less than 0.2V/m?

Gases

31. Is dry, oil-free nitrogen at 1 bar (15 psi) with 6 mm coupling available?
32. Is dry, oil-free nitrogen or compressed air at 4 bar (60 psi) with 6 mm coupling available?

Sample Solutions

33. Are these available?

Maintenance equipment

34. Is there an ultrasonic bath available?
35. Is glassware available to clean components?

Is there anything further that you feel we should be made aware?