

User Requirement Specification - Lintott Processor and Vacuum Control Systems Upgrade

1.0 Introduction

The current Lintott processor and vacuum control systems, although still functioning, are now obsolete and difficult to maintain. As a result we may well experience a decline in customer confidence in the future, unless we can assure them of a stable process, which we are finding increasingly difficult to do.

2.0 Overview

The upgrade will be carried out by Complete Ion, who will install, commission and provide support and documentation for the new installation.

3.0 Related Documents

4.0 Parts to be installed

5.0 Off Site Tasks

- 5.01 Preparation of all drawings and documentation before the installation begins.
- 5.02 Writing of software and software documentation.
- 5.03 Testing of software and hardware as and where possible.
- 5.04 The installation qualification (IQ) to be written and supplied by Complete Ion.

6.0 Commissioning

- 6.01 The Lintott processor and vacuum electronic controls are to be changed in such a way so as to minimise disruption of service during installation and testing.
- 6.02 The new system is to be as functionally similar to the existing system as is possible, so as to incur minimal staff training. Apart from any new required functionality
- 6.03 To ensure that all works are fully tested and functioning in accordance with the supplied documentation.
- 6.04 Full training to be given to relevant staff at Steris Harwell, including written notification of changes and what differences in operation may be expected.

7.0 Scope

- 7.01 The supplier will provide full project management during the installation and testing of the equipment being installed.

8.0 Documentation

- 8.01 Installation drawings will be generated during the design phase and supplied with the installed systems.
- 8.02 All aspects of the installation will be fully tested to prove the correct installation and performance of the equipment.
- 8.03 Testing will be to pre-agreed test specifications.
- 8.04 All design drawings and information necessary to fault find and maintain the installed systems will be provided to Steris Harwell on completion of testing.
- 8.05 Appropriate training will be given to Steris Harwell staff after installation and commissioning of the systems.

9.0 Maintenance

- 9.01 The installation must allow for easy access to all components and equipment for maintenance purposes.
- 9.02 Maintenance manuals (OEM) for all equipment must be provided.

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Our Requirements are as follows:

The new functionality should include the following:

The ability to advance the carousel one plate position at a time, to facilitate easy loading and unloading. Possibly a foot switch or other hand pressed switch, mounted at the loading position.

The ability to display, store and print each run's parameters, including beam current, beam current deviation, motor speed, motor speed deviation, energy, run time, interruptions etc.

The ability of the motor to slow down in response to beam drop off.

A manual mode which bypasses interlocks for maintenance and fault finding, and an interrupt button to stop the implant at any time.

A networked control room console and clean room console, with the possibility of remote access, SSH. Displays based on html.

Indicators

The following display indicators are required:

- Audible/visual error alarm
- Carousel at load position.
- Estimated time to completion display.
- Progress indicator.
- Run complete.
- Set scans
- Scans completed.
- Set dose
- Dose check.
- Energy check.
- Motor speed. (Graphical/analogue meter)
- Beam current. (numeric/graphical/analogue meter)
- Chamber door open/closed. (interlock)
- Alarms/interruption.
- Beam setup mode.
- Beam ready.
- Control mode.
- Control ready
- Implant mode
- implant in progress.
- Roughing valve open/closed
- Vent valve open/closed (interlock)
- Gate valve open/closed.
- Hi-vac valve open/closed
- Chamber vacuum good/bad. (interlock)
- Beam line vacuum good/bad. (interlock)
- Carousel Up/Down.

Controls

An emergency stop.

Implant Mode - *PRODUCTION MODE*

Alarm mute/reset.

Beam mode interlock (prevents Beam Mode Start after run finishes only)

Beam Mode Start.

Control Mode Start.

Implant mode Start.

Reset all modes

Scans Set

Dose Set

Current Range Select?

Maintenance Mode

Carousel up/down

Motor start

Motor speed control

Rough valve open/close

Gate valve open/close

Vent valve open/close

Vanes open/close

Vacuum (implant mode)

Start Vacuum

Stop Vacuum (close Hi-vac valve)

Vent Chamber

Notes:

Interlocks

Chamber door open or Vent valve open should prevent:

1. Control Mode
2. Implant mode
3. Roughing valve open
4. Gate valve open
5. Hi-vac valve open