



USER MANUAL



MESO™ SECTOR S 600



FOR RESEARCH USE ONLY. NOT FOR USE IN DIAGNOSTIC PROCEDURES.

Disclaimer of Warranty and Liability

MESO SCALE DIAGNOSTICS, LLC. ("MSD") MAKES NO REPRESENTATION OR WARRANTY OF ANY KIND, AND HEREBY EXPRESSLY EXCLUDES AND DISCLAIMS ANY AND ALL REPRESENTATIONS AND WARRANTIES WITH REGARD TO THIS INSTRUMENT MANUAL (THIS "MANUAL"), INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY, SUITABILITY OR FITNESS FOR A PARTICULAR PURPOSE, DATA ACCURACY, SYSTEM INTEGRATION, QUIET TITLE OR NONINFRINGEMENT. NO STATEMENT IN THIS MANUAL SHALL BE INTERPRETED TO GRANT OR EXTEND ANY WARRANTY ON THE PRODUCTS DESCRIBED HEREIN. MSD SHALL NOT BE LIABLE FOR ERRORS OR OMISSIONS CONTAINED HEREIN OR FOR ANY DAMAGES OF ANY KIND, INCLUDING, BUT NOT LIMITED TO DIRECT, INDIRECT, SPECIAL, INCIDENTAL, CONSEQUENTIAL OR PUNITIVE, WHETHER ARISING IN CONTRACT, TORT, STRICT LIABILITY OR OTHERWISE, THAT MAY BE INCURRED IN CONNECTION WITH THE FURNISHING, PERFORMANCE OR USE OF THIS MANUAL.

Changes in Publication

The information contained in this Manual is subject to change without notice.

Unauthorized Use of Manual Material

No part of this Manual may be duplicated, reproduced, stored in a retrieval system, translated, transcribed, or transmitted in any form or by any means without the express prior written permission of MSD. This Manual shall be returned to MSD within two (2) business days following any request by MSD.

Unauthorized Use of Trademarks or Service Marks

MESO SCALE DISCOVERY, MESO SCALE DIAGNOSTICS, MSD, DISCOVERY WORKBENCH, MULTI-ARRAY, MULTI-SPOT, QUICKPLEX, SECTOR, SECTOR PR, SECTOR HTS, SULFO-TAG, V-PLEX, STREPTAVIDIN GOLD, MESO, www.mesoscale.com, SMALL SPOT (design), 96 WELL 1, 4, 7, & 10-SPOT (designs), 384 WELL 1 & 4-SPOT (designs), MSD (design), V-PLEX (design), and SPOT THE DIFFERENCE are trademarks and/or service marks of Meso Scale Diagnostics, LLC. Unauthorized use of any MSD trademark or service mark may be a violation of federal and state trademark laws and is strictly prohibited by Meso Scale Diagnostics, LLC.

All other trademarks or service marks are the property of their respective owners.

© 2013. Meso Scale Diagnostics, LLC. All rights reserved.

Manual Part Number: IM-MN-002-A

November 2013

Printed in USA

Table of Contents

1	Introduction.....	7
1.1	Intended Audience.....	7
1.2	How to Use This Manual.....	7
1.3	Formatting Information.....	8
2	Important Information.....	10
2.1	General Operation.....	10
2.2	Hazards.....	11
2.2.1	Electrical.....	11
2.2.2	Chemical and Biological.....	12
2.2.3	Mechanical.....	13
2.2.4	ESD Sensitivity.....	13
2.2.5	Electromagnetic Interference and Susceptibility.....	13
2.3	Software Compatibility.....	14
2.4	Decontamination Prior to Shipping or Servicing.....	14
3	System Description.....	16
3.1	Intended Use.....	16
3.2	Specifications Overview.....	16
3.3	Plate Compatibility.....	16
3.4	System Components.....	16
3.5	The SECTOR S 600 Instrument.....	17
3.5.1	CCD Camera and Telecentric Lens.....	18
3.5.2	Motion Control System.....	18
3.5.3	Plate Barcode Readers.....	18
3.5.4	MULTI-ARRAY Plate Input/Output Stacker.....	19
3.5.5	Stack Tubes.....	19
3.5.6	Single Plate Adaptor.....	20
3.5.7	Stacker Cover Plate.....	20
3.5.8	Status LEDs.....	21
3.5.9	Power Switch and Input/Output (I/O) Panel.....	22
3.5.10	Halt Button.....	23
3.6	Microsoft Windows-Compatible Workstations.....	24
3.7	MSD DISCOVERY WORKBENCH Software.....	25
3.8	Operational Modes.....	25
3.9	Image Readout.....	25
3.10	MESO SECTOR Demonstration Test Plate.....	26
3.11	Uninterruptible Power Supply.....	27
4	Installation.....	29
5	Quick Start.....	31
5.1	Start-up.....	31
5.2	Setup.....	33
5.3	Run.....	34
5.3.1	Operations.....	35
5.4	Results.....	36
6	Using the SECTOR S 600.....	38
6.1	Single Plate Run.....	38

6.2	Stack Run—Multiple Plates	38
6.2.1	Loading the Stack Tube	38
6.2.2	Unloading the Stack Tube.....	40
6.3	Robotics Integration	40
7	Maintenance	42
7.1	Preventive Maintenance	42
7.2	Instrument Cleaning	42
7.2.1	Adapter and Stack Tube Cleaning.....	43
7.3	Instrument Decontamination	43
8	Appendix.....	45
8.1	Troubleshooting Guide	45
8.2	Specifications	46
8.2.1	SECTOR S 600.....	46
8.2.2	Scientific Performance	46
8.2.3	Environmental Specifications.....	47
8.2.4	Power Requirements	47
8.2.5	SECTOR S 600 Physical Dimensions	47
8.2.6	Plate Standard Read Volume (per Well)	47
8.2.7	Custom Bar Code Compatibility*	47
8.2.8	Plate Specifications.....	47
8.3	Regulatory and Safety Certifications	48
8.3.1	WEEE Compliance.....	48
8.4	Symbols and Labels	49
9	Technical Support.....	51
9.1	Bug Reports and Suggestions	51
9.2	Problems Running SECTOR S 600 Instruments.....	51
9.3	How to Contact Us	51

List of Figures

Figure 2:1	SECTOR S 600 electrical hazards.....	11
Figure 3:1	SECTOR S 600 system.	17
Figure 3:2	SECTOR S 600 components.....	18
Figure 3:3	Input (right) stacker interface plate.....	19
Figure 3:4	Fully loaded standard and high capacity stack tubes	20
Figure 3:5	SECTOR plate in single plate adaptor	21
Figure 3:6	SECTOR S 600 status LEDs	22
Figure 3:7	Power switch and I/O panel.	23
Figure 3:8	SECTOR S 600 halt button.....	24
Figure 3:9	Cable attachment locations for SECTOR S 600	24
Figure 3:10	The SECTOR S 600 reads 96-well plates in six sectors.....	25
Figure 3:11	MESO SECTOR Demonstration Test Plate.....	26
Figure 3:12	Loading a demonstration plate.....	27
Figure 5:1	Instrument Status window.....	31
Figure 5:2	MSD DISCOVERY WORKBENCH desktop icon	32
Figure 5:3	SECTOR S 600 icon	32
Figure 5:4:	MSD DISCOVERY WORKBENCH splash screen.....	32
Figure 5:5	SECTOR S 600 Window: Setup, Plate Summary, and Operations areas.....	33

Figure 5:6 Stacker cover over the output port with empty single plate adapter in the input port.....	34
Figure 5:7 MESO SECTOR demonstration plate in the single plate adaptor	34
Figure 5:8 SECTOR S 600 window, Run Options dialog box	35
Figure 5:9 Demonstration plate results, Color Map layer	36
Figure 6:1 Loading MULTI-ARRAY plates into stack tube	39

List of Tables

Table 3:1 Stack tube plate capacities	19
Table 8:1 Troubleshooting guide.....	45
Table 8:2 Scientific performance	46
Table 8:3 Symbols and labels	49

Introduction

1 Introduction

MESO SCALE DISCOVERY® (MSD) develops, manufactures, and markets biological assays that provide cost-effective and valuable information to scientists in drug discovery, therapeutic screening, and life science research. MSD's product portfolio is based on MULTI-ARRAY® technology, a proprietary combination of patterned arrays and electrochemiluminescence detection that results in exceptional sensitivity, speed, dynamic range, and convenience.

MSD® develops, manufactures, and markets detection instrument systems as well as a line of assay kits for use with these instruments, a proprietary line of reagents, and custom microplate printing and assay development services. MSD MULTI-ARRAY microplates are available in 96-, 384-, and 1536-well formats with standard or high-binding surfaces. MSD plates may be purchased uncoated or coated with proteins such as streptavidin or avidin, with anti-species antibodies such as goat anti-mouse or goat anti-rabbit, or with antibodies against specific analytes. Custom coatings and surface treatments are available.

MSD MULTI-ARRAY plates are available as single spot (single assay) plates and as MULTI-SPOT® plates with patterned spot arrays in each well. MULTI-SPOT plates measure multiple analytes simultaneously in a single well, increasing throughput and enabling novel assay panels.

For more details and information about applications, please visit the MSD website at www.mesoscale.com.

1.1 Intended Audience

This manual is for all users of the MESO SECTOR® S 600. Users should understand general computer and Microsoft Windows terminology, and be familiar with standard laboratory practices. The intended users of the SECTOR S 600 are those conducting research in the life sciences.

This manual describes how to operate the SECTOR S 600 and acquire data. The analysis of this data is treated in a separate manual: DISCOVERY WORKBENCH® User's Guide.

1.2 How to Use This Manual

This publication is intended as reference and instruction for users of SECTOR S 600 that is designed to read MSD MULTI-ARRAY and MULTI-SPOT plates.

This manual is divided into chapters containing main topics and subsections. Use the hyperlinked Table of Contents to find topics of interest quickly. The List of Figures and List of Tables hyperlink to the images and tables that enhance understanding of written information in this manual. The Appendix contains supplemental information on troubleshooting, instrument specifications, safety symbols, regulatory information, and labels.

Tips



Tips provide extra information or details that help users perform functions more efficiently.



Notes

Notes provide supplemental information on the proper use of the SECTOR S 600 and its software.

Warnings and Caution Symbols


WARNING

General warnings advise operators of potential hazards and highlight the procedures or information necessary to avoid personal injury during use of the SECTOR S 600.

Symbol	Explanation
	Risk exists for a mechanical, chemical, or safety hazard
	Risk exists for an electrical hazard

CAUTION

A caution note highlights procedures or information necessary to avoid damage to equipment, corruption of software, loss of data, or invalid test results.

 **CAUTION:** Carefully read and understand all information in this document. Failure to read, understand, and follow the instructions in this publication may result in damage to the product, injury to operating personnel or poor instrument performance

1.3 Formatting Information

This guide uses the following formatting conventions:


- Internal hyperlinks are formatted bold/gray. Click to jump instantly to the referenced section or figure.
- Clickstreams are indicated with arrows and always start with a top-level menu item: Select Tools → Plate Data History.
- Information to be entered by the user is shown in italics: Enter *5*.
- Information that the user chooses based on what is displayed is bracketed: Double-click <experiment name>
- When referring to a term as it appears in the software, we capitalize it exactly as it is capitalized on-screen: Select Read from Bar Code from the Plate Type menu.


Important Information


2 Important Information


2.1 General Operation


The SECTOR S 600 is designed to run 24 hours a day. Once initialized, the SECTOR S 600 enters standby mode when plates are not running. Standby maintains the CCD detector temperature. The SECTOR S 600 requires no additional initialization when left in standby mode.

 **WARNING:** The instrument can only be operated with all covers in place. If the unit is operated in any manner not specified in this manual, the protection provided by the equipment may be impaired.


 **CAUTION:** Installation of additional software on the computer system used to operate the SECTOR S 600 is not supported. Specifically, updating aspects of the operating system or installing any software that changes parameters of the computer environment could interfere with proper operation of the instrument software.

 **CAUTION:** Running screen-savers, automated maintenance software, network-security software, and other possible software on the SECTOR S 600 computer system could cause conflicts with the operation of the instrument software.

 **CAUTION:** The instrument generates files when running. Virus scanning on the instrument computer can interfere with instrument operation. It is suggested that any virus checking software run on the instrument be configured to minimize the scanning of newly generated files while the instrument is operating.


 **CAUTION:** Use of other applications while plates are being read may interfere with system performance. Use of operating system power features that disable USB communication, such as Hibernate or Sleep, will cause the system to stop responding and requires a power off/on cycle of the instrument and PC to restore function.


 **CAUTION:** Additional USB devices may *not* be connected to the SECTOR S 600 computer system.

 **CAUTION:** Changes to the computer clock can cause a system error if the changes are made during a plate read. A system error may also occur if a plate is being read when the time is automatically changed from standard to daylight savings time or vice versa.

NOTE: The SECTOR S 600 should be operated in a dust-free environment with an ambient temperature between 20–26°C, and humidity levels between 10–80% (non-condensing). Environments or locations with high levels of vibration should be avoided. See Section 8.2.3 **Environmental Specifications** for complete environmental specifications.

 **CAUTION:** Keep the SECTOR S 600 away from direct sources of heat or cold and direct sunlight. Ensure that the rear cooling vents and the CCD camera tower cooling vents on the SECTOR S 600 are *not* blocked.

 **CAUTION:** Do not place any objects, materials, or liquid containers on top of the SECTOR S 600.

 **CAUTION:** Falling objects or splashing liquids, including chemically reactive or infectious reagents, can cause damage to the instrumentation or cause injuries. Avoid handling or storing infectious or radioactive materials near the SECTOR S 600.

2.2 Hazards

This section contains notices and warnings that should be read carefully. Before working with the SECTOR S 600, become familiar with all safety precautions and regulations concerning the handling of materials and the instrument's electrical and mechanical components.

Operating this device in a manner not specified by MESO SCALE DISCOVERY may impair the electrical and thermal protection provided by the equipment.

As with most laboratory instruments, the SECTOR S 600 presents certain hazards for users. We have identified five key types of hazards:

- Electrical
- Chemical and biological
- Mechanical
- ESD sensitivity

Figure 2:1 SECTOR S 600 electrical hazards.




2.2.1 Electrical

Do not attempt to open the instrument cover and work with any electronic elements. An electrical shock may occur. The SECTOR S 600 was designed and tested in compliance with appropriate electrical safety standards.

WARNING: The SECTOR S 600 contains AC voltages. DO NOT ATTEMPT TO SERVICE OR REPAIR THE SECTOR S 600. Please contact MSD Instrument Service for all service and repair, including electrical problems.

When the power switch is in the off position, all internal electrical circuits are disconnected from both the live and neutral lines of the electrical power source.





 **WARNING:** For best performance, remove any sample or reagent spillage from the instrument. For safety, the operator should power down the instrument and disconnect the SECTOR S 600 power cable from the wall socket prior to cleaning near moving parts. For significant spills or liquid intrusion into the instrument enclosure (e.g. resulting from a fire protection water sprinkler), contact MSD [Instrument Service](#).

The SECTOR S 600 should not be operated in hazardous atmospheres, as defined by the National Fire Protection Association, the National Electric Code, and International Standards.

Although the SECTOR S 600 is shielded and grounded, laboratory personnel should never remove any instrument covers that would expose electrical circuits. Only authorized MSD Service personnel should perform repairs to the interior of the SECTOR S 600.

NOTE: We *strongly* recommend that users of laboratory instruments (such as the SECTOR S 600) follow the Clinical and Laboratory Standards Institute (CLSI) document entitled GP17-A2, Clinical Laboratory Safety; Approved Guideline, Section 19, Instrument Testing.

 **CAUTION:** Grounding and polarity checks should be conducted on all electrical outlets annually, and the results of these tests should be documented. New or incoming equipment should also undergo electrical safety checks before use. Power cords should be inspected annually for integrity.

 **CAUTION:** Do not use a two-prong plug or extension cord to connect primary power to the SECTOR S 600. Use of a two-prong adaptor disconnects utility ground, creating a shock hazard. Always connect the system power cord directly to a three-prong receptacle with a functional ground.

2.2.2 Chemical and Biological


Users are responsible for taking all necessary precautions against hazards associated with the use of laboratory chemicals. Running assays on the SECTOR S 600 may involve the use of potent chemicals—such as bases and solvents, cleaning and disinfection agents, and assay reagents. Such chemicals should be independently evaluated for chemical or biological hazards.


Laboratory regulations and good laboratory practices concerning the use of such chemicals should be followed at all times. Use personal protective equipment recommended by your facility when handling any of these reagents.

Product labels, package inserts and product information sheets with specific usage recommendations are provided for all plates and reagents used with the SECTOR S 600. Contact MSD [Scientific and Technical Support](#) to obtain material safety data sheets (MSDS) for MSD plates and reagents.

Samples, user reagents, or controls used in assays may be infectious or biohazardous. By working with these materials, users may be exposed to biological hazards. Laboratory regulations concerning the handling of potentially infectious material should be followed at all times.

Users should avoid breathing reagent fumes or aerosols. Gloves and goggles should be worn when disposing of used plates. If skin comes in contact with reagents, rinse the exposed area with water immediately and follow appropriate safety protocols as determined by your facility. Dispose of used plates according to federal, state, and local regulations.

 **WARNING:** Wear gloves. Avoid skin contact and inhalation when handling plates that contain or have been exposed to hazardous reagents.

 **WARNING:** The stacker input and output locations are considered susceptible to contamination during normal use. Use of personal protective equipment and good laboratory practices are strongly suggested when working in these areas.

2.2.3 Mechanical

⚠ WARNING: The SECTOR S 600 weighs 150 lbs (68 kg). Be careful to use proper technique when lifting it to minimize the risk of injury. Two or more people should lift from beneath the instrument. Please contact MSD **Instrument Service** before attempting to move the instrument.

⚠ WARNING: The SECTOR S 600 presents potential mechanical hazards. To avoid injury, do not touch any part of the instrument while it is in operation. Do not place fingers in stack tubes or the plate carrier when the instrument is in operation. Labels are affixed to the stack tube platforms indicating a pinch hazard.



⚠ CAUTION: When using robotic plate loaders (robots), ensure that there is nothing present that will obstruct robot movement.

⚠ WARNING: Moving parts of the SECTOR S 600 can be damaged or become misaligned when exposed to strong mechanical force. As with any mechanical instrument, you should take certain precautions when operating the SECTOR S 600:

- Do not wear loose garments or jewelry that could catch in moving mechanisms.
- Operate the instrument with the cover intact.
- Keep hands away from pathways of moving parts during operation.
- Do not attempt mechanical repair.
- Do not bump into or lean on the SECTOR S 600, or place any objects on top of it.
- Never operate the instrument unless both stacker ports contain a single plate adaptor (Figure 3:5), a stack tube (Figure 3:4), or the stacker cover plate (Figure 3:5).

2.2.4 ESD Sensitivity


The SECTOR S 600 has been tested for electrostatic discharge (ESD) sensitivity and complies with the applicable international standards. Standard installation precautions should be taken when stationing the instrument for regular use. Like many instruments of its kind, the SECTOR S 600 is sensitive to static discharge in excess of 4.0 kV. In typical laboratory environments, electrostatic discharge should not be a problem.

2.2.5 Electromagnetic Interference and Susceptibility

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference, in which case users will be required to correct the interference at their own expense.

Changes or modifications not expressly approved by MSD may void the warranty. The operator shall use any special accessories provided with the equipment such as the power supply or shielded cables that are necessary for compliance with FCC standards.

⚠ CAUTION: SECTOR S 600 instrument has been tested for operation in a controlled electromagnetic environment. Transmitters of RF energy such as mobile (cellular) telephones should not be used in close proximity.

 **CAUTION:** To avoid interference from voltage transients, the computer and instrument should be powered by the same electrical circuit. This may be accomplished using an uninterruptible power supply (UPS), power strip of proper electrical rating, or by verifying the power wall outlets. If one of these is not possible, a ground strap should be used to connect the instrument chassis to the computer chassis. Please contact MSD [Scientific and Technical Support](#) if you have questions or need assistance.

2.3 Software Compatibility


The Microsoft Windows Update service can affect the operation of the instrument software. When running, the update application can turn off the database services upon which the instrument relies, causing errors and stopping instrument operation. Updates should not be run during instrument use. Run manually or schedule Windows updates when you are sure that the instrument will not be in use.

Occasionally, Windows Update does not restart the database server after it runs. This will cause the instrument software to run incorrectly. Restarting the computer will restart the database service and restore the instrument to full operation.

The SECTOR S 600 system has not been tested for compatibility with all programs. Installation of additional applications, such as anti-virus and security programs may interfere with function.

2.4 Decontamination Prior to Shipping or Servicing

The SECTOR S 600 may have been used to analyze infectious materials or in an environment where infectious materials were handled. For the protection of future users and service personnel, please follow site safety procedures and the directions of the site safety officer to disinfect the SECTOR S 600 before shipping or service. Please contact MSD [Instrument Service](#) for details.

 **WARNING:** Follow site safety procedures and the directions of the site safety officer to determine decontamination requirements for the SECTOR S 600 before shipping or service.

System Description

} System Description

3.1 Intended Use

The SECTOR S 600 is for Research Use Only. The instrument is not for use in diagnostic procedures.

3.2 Specifications Overview

The SECTOR S 600 offers high sensitivity and six logs of dynamic range. The SECTOR S 600 instrument reads plates at a rate of approximately 70 seconds per plate. Using MSD DISCOVERY WORKBENCH software, all models provide the capability to interact with a third party external robotic controller.

3.3 Plate Compatibility

The SECTOR S 600 is compatible with:

- 96- and 384-well MULTI-ARRAY plates
- 96-well, 4-, 7-, and 10-spot MULTI-SPOT plates
- 384-well, 4-spot MULTI-SPOT plates
- 1536-well MULTI-ARRAY plates

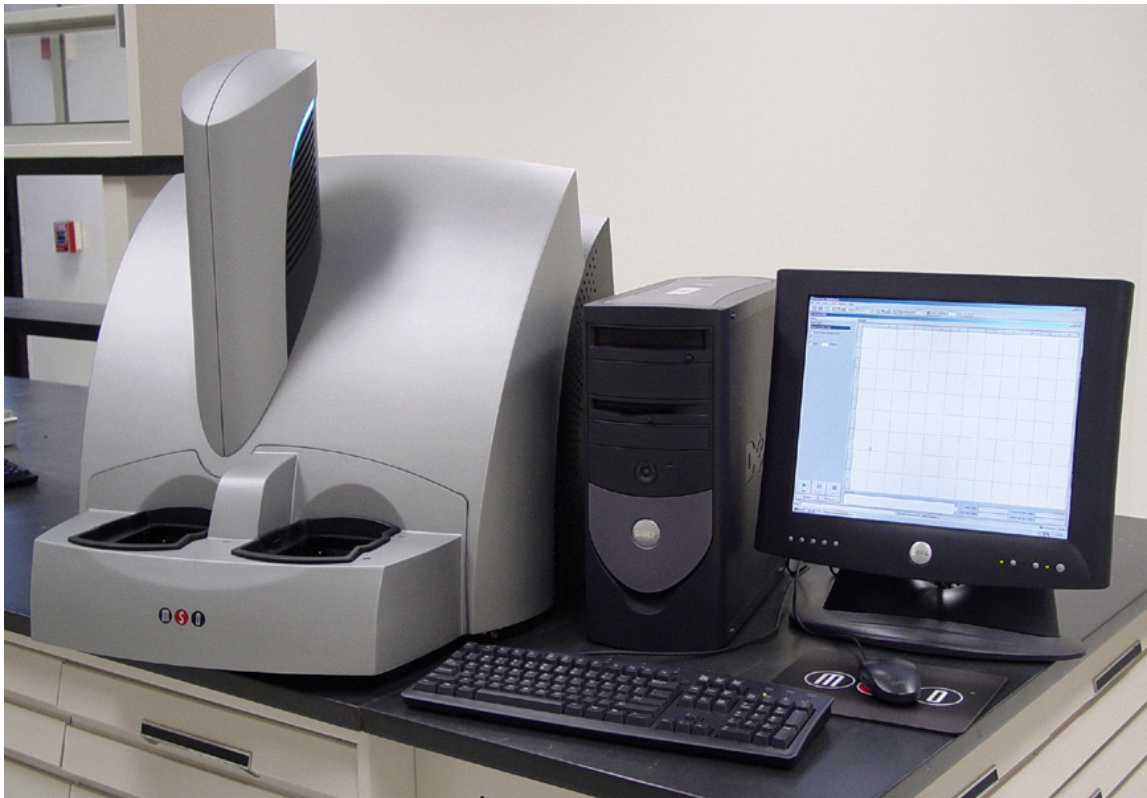
MULTI-ARRAY and MULTI-SPOT plates are designed to be read only once and may not be reused.

3.4 System Components

A standard SECTOR S 600 system consists of the following (Figure 3:1):

- SECTOR S 600 instrument
- Microsoft Windows-compatible computer workstation
- MSD DISCOVERY WORKBENCH software
- MESO SECTOR Demonstration Plate
- Instrument Cables: AC power and USB
- Uninterruptible power supply (UPS)
- SECTOR S 600 Instrument Manual (supplied electronically on desktop)
- DISCOVERY WORKBENCH User Guide (supplied electronically on desktop)

Figure 3:1 SECTOR S 600 system.



3.5 The SECTOR S 600 Instrument

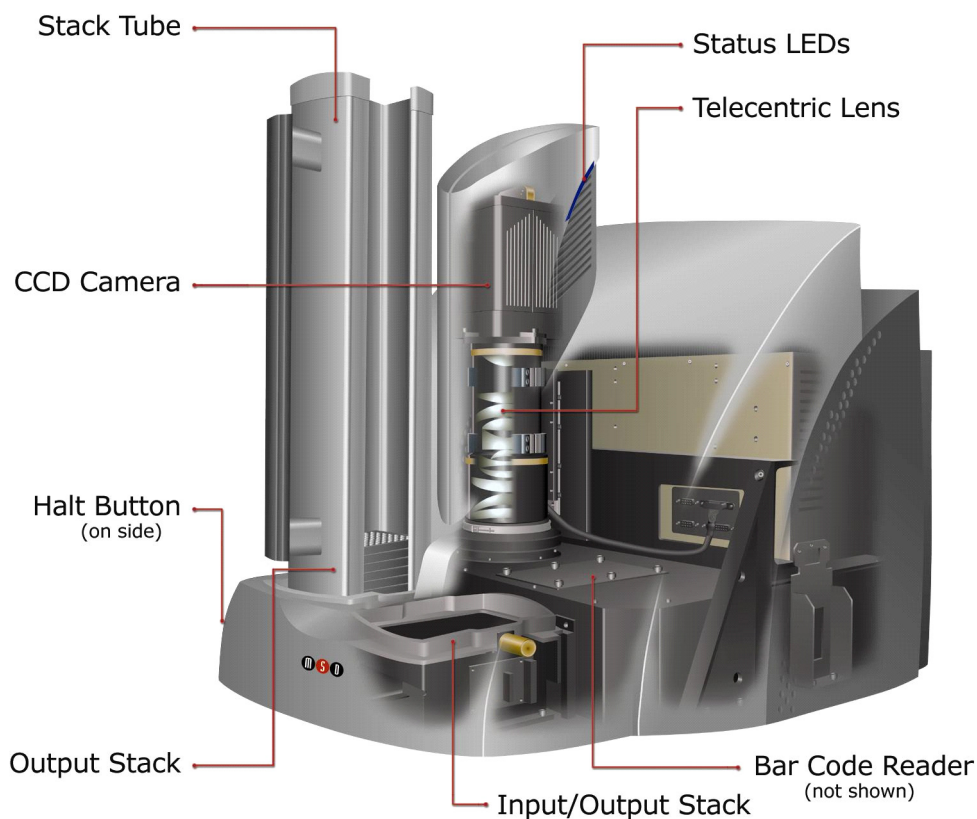
The main components of the SECTOR S 600 include (Figure 3:2):

- CCD camera and telecentric lens
- Motion control system
- Plate barcode readers (short and long side)
- Integrated MULTI-ARRAY plate input/output stack
- MULTI-ARRAY plate Stack Tubes (2, standard capacity)
- Single Plate Adaptor (1, not shown)
- One Stacker Cover Plate (1, not shown)
- Instrument status LEDs
- Power switch and I/O panel (not shown)
- Motion Halt button



Additional stack tubes, single plate adaptors, and stacker cover plates may be purchased from MSD.

Figure 3:2 SECTOR S 600 components



3.5.1 CCD Camera and Telecentric Lens

The SECTOR S 600 uses a sensitive, high-resolution CCD camera and lens system to detect light emitted from MULTI-ARRAY plates. The instrument reads plates using 6 sectors or segments, yielding higher throughput than comparable single-well detection systems.

Once the instrument is turned on and the software is started, it takes approximately 45 to 60 minutes for the CCD chip to reach and stabilize at its normal operating temperature of $-35 \pm 1^\circ\text{C}$. The telecentric lens of the SECTOR S 600 provides high efficiency and uniform collection of light from MULTI-ARRAY plates.

3.5.2 Motion Control System

The SECTOR S 600 uses a precision mechanism for transporting MULTI-ARRAY plates from the input stacker, into the CCD detector's viewing area, and back to either the input or output stacker, depending on selections in the DISCOVERY WORKBENCH Software. (See Section 6 Using the SECTOR S 600) for more information on reading a plate.)

3.5.3 Plate Barcode Readers

The SECTOR S 600 instrument's two barcode readers read the barcode(s) on the MULTI-ARRAY plates. The MULTI-ARRAY plates come with an MSD barcode label that uniquely identifies the plate and allows the SECTOR S 600 to detect the type of plate being run.

If desired, the user may apply a custom barcode label either on the same side of the plate as the MSD barcode or on one of the short sides of the plate. The custom barcode label should be applied at the same height as the MSD barcode label. The custom barcode must be of one of the following formats: **Code 39** or **Code 128**.

To enable custom bar codes, when the SECTOR S 600 reader window is open, go to Tools → Instrument Configuration. Select Enable Long-side Custom Bar Code Reader and/or Enable Short-side Custom Bar Code Reader.

Please contact MSD Scientific and Technical Support for additional information regarding the use of custom barcodes on MSD MULTI-ARRAY plates.

3.5.4 MULTI-ARRAY Plate Input/Output Stacker

SECTOR S 600 includes an integrated mechanism to manipulate multiple MULTI-ARRAY plates arranged vertically (referred to as the “stacker”). The stacker will automatically pull plates from the input (right) side and eject them into the output (left) side. The stacker may be used with two single plate adaptors or two stack tubes or one of each. Stacker cover plates or single plate adaptors containing an empty plate should be used over the stacker interface plates whenever the machine is not in use.

When running single plates, the input (right) stacker interface plate can act as both input and output ports. For safety, place a stacker cover plate over the left stacker interface plate when not in use.

⚠ WARNING: The stacker contains components that may move at any time. Users of the SECTOR S 600 should never place their fingers into the stacker for any reason unless the instrument is powered off.



3.5.5 Stack Tubes

Stack Tubes allow the semi-automated processing of multiple plates in sequence. MSD offers standard-capacity (standard) and high capacity (extended) stack tubes (Table 3:1) for the SECTOR S 600. When using stack tubes, ensure that the stack tube is fully seated on the stacker interface plate (Figure 3:3). The standard tubes are provided with the SECTOR S 600, and both standard and extended tubes are separately available for purchase (Figure 3:4).

Table 3:1 Stack tube plate capacities

Stack Tube	Plate Type	Capacity
Standard (Standard Capacity)	96-well MULTI-ARRAY	20 plates
Standard (Standard Capacity)	384-well MULTI-ARRAY	30 plates
Extended (High Capacity)	96-well MULTI-ARRAY	50 plates
Extended (High Capacity)	384-well MULTI-ARRAY	75 plates

Figure 3:3 Input (right) stacker interface plate

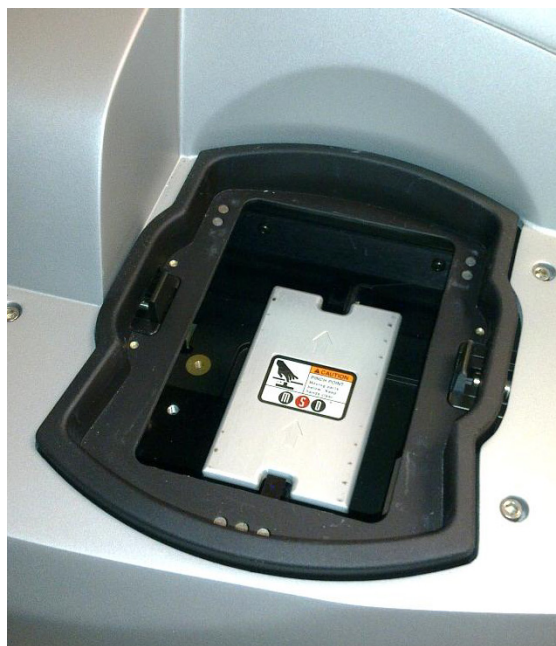


Figure 3:4 Fully loaded standard and high capacity stack tubes



3.5.6 Single Plate Adaptor

The SECTOR S 600 has the ability to reads single plates placed manually with minimal effort into a single plate adaptor. When inserting the single plate adaptor into the stacker, ensure that the adaptor is fully seated on the stacker interface plate. [Figure 3:5](#) (right side of image) shows a single plate properly loaded in the single plate adaptor. The single plate adaptor also allows use of the instrument with laboratory robotic systems.

3.5.7 Stacker Cover Plate

The stacker cover plate ([Figure 3:5](#) left side of image) is used to cover the output (left) stacker interface when the machine is set to return single plates to the input side.

Figure 3:5 SECTOR plate in single plate adaptor



A stacker cover plate should always be in place when no stack tube or single plate adaptor is present.

3.5.8 Status LEDs

The status LEDs built into the camera tower indicate the current operational mode of the SECTOR S 600 (Figure 3:6).

- **Steady blue:** Instrument is in standby mode
- **Blinking blue:** Instrument is currently reading a plate
- **Steady red:** Instrument is in fault mode or is waiting for the addition of plates

Figure 3:6 SECTOR S 600 status LEDs



3.5.9 Power Switch and Input/Output (I/O) Panel

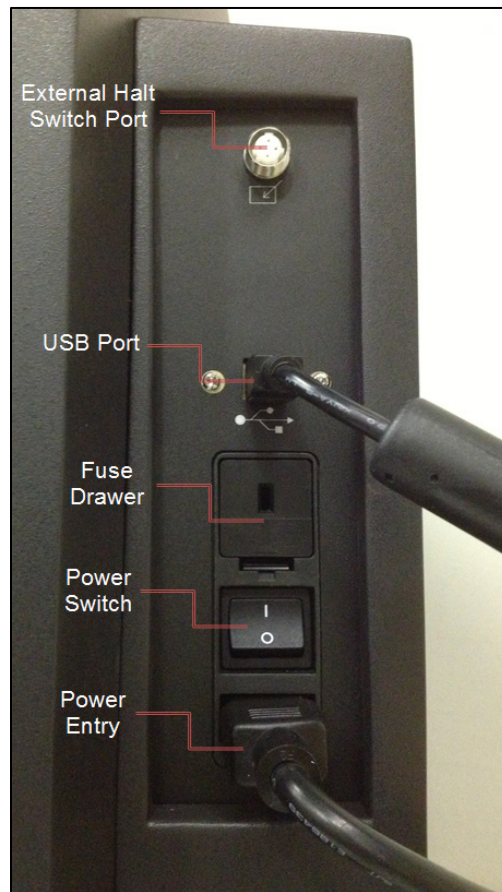
The I/O panel of the SECTOR S 600, located on the rear right side of the SECTOR S 600, includes the instrument's power switch, power entry module, and connectors for USB, RS-232, camera serial communications, and robotic halt activation cables (Figure 3:7).

The instrument can be powered-on and off via the power switch. Typically, the instrument should be left powered-on to maintain camera temperature.

NOTE: Only use the communications cables supplied with the SECTOR S 600. Use of cables other than those supplied may degrade instrument performance.


A halt connector is present in order to add an external switch that will de-energize the motion control system. The SECTOR S 600 connector receptacle is Hirose Electric Co Ltd HRS, Part #SR30-10R-4S. The mating connector is Hirose Part #SR30-10PE-4P, SR30-10PM-4P, or SR30-10PQ-4P.

Figure 3:7 Power switch and I/O panel.



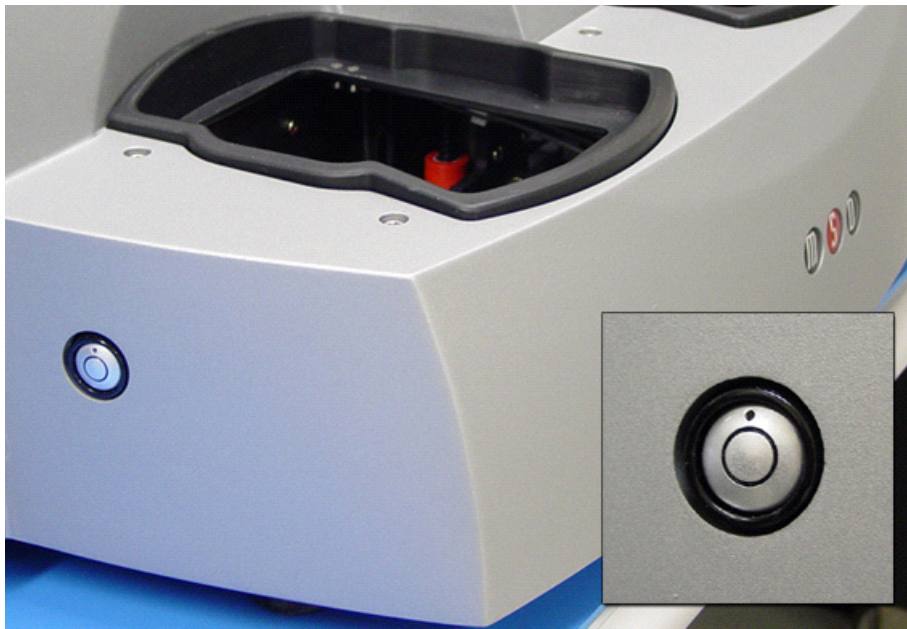
3.5.10 Halt Button

The halt button (Figure 3:8) is mounted on the front left side of the SECTOR S 600. This switch is on/off. If it is pressed for any reason, all motion will halt. It **must** be pressed again before the motion system and software will function. This button immediately de-energizes the main motion control components in the instrument. However, the remaining electronic components of the instrument remain powered and still pose a shock hazard.

 The halt switch should never be obstructed or restricted from access.

The halt function can also be accessed through the rear I/O panel to enable external safety devices to halt the motion of the SECTOR S 600. Please contact MSD [Scientific and Technical Support](#) for more information on this feature.

Figure 3:8 SECTOR S 600 halt button

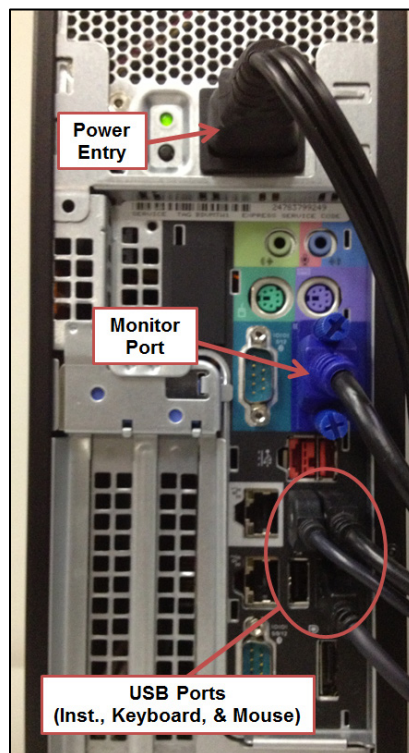


3.6 Microsoft Windows-Compatible Workstations

Computer workstations are configured by MSD for use with the SECTOR S 600 and come preloaded with MSD DISCOVERY WORKBENCH application software (3.7 MSD DISCOVERY WORKBENCH Software). The workstation includes a personal computer, display, keyboard, and mouse. The instrument computer and its software are an integral part of the system, configured at the manufacturer, and should only be modified by a MSD Service Engineer.

I/O connections on the associated computer workstation are shown in Figure 3:9.

Figure 3:9 Cable attachment locations for SECTOR S 600



3.7 MSD DISCOVERY WORKBENCH Software

DISCOVERY WORKBENCH is a Windows application that supports the operation of the SECTOR S 600 instrument, stores both current and historical plate data, and analyzes and presents results. The application has several components: instrument modules, a secure database (the Plate Data History), kit layouts, data integrity features, and data analysis functions. Please refer to the DISCOVERY WORKBENCH User's Guide for additional information.

3.8 Operational Modes

The SECTOR S 600 can be configured as a stand-alone workstation or integrated into robotic systems using the single plate adaptor provided. The single plate adaptor replaces the input stack tube and can serve as the load/unload location when using a robot for loading plates or when loading a single plate manually.

SECTOR S 600 has four operational modes:

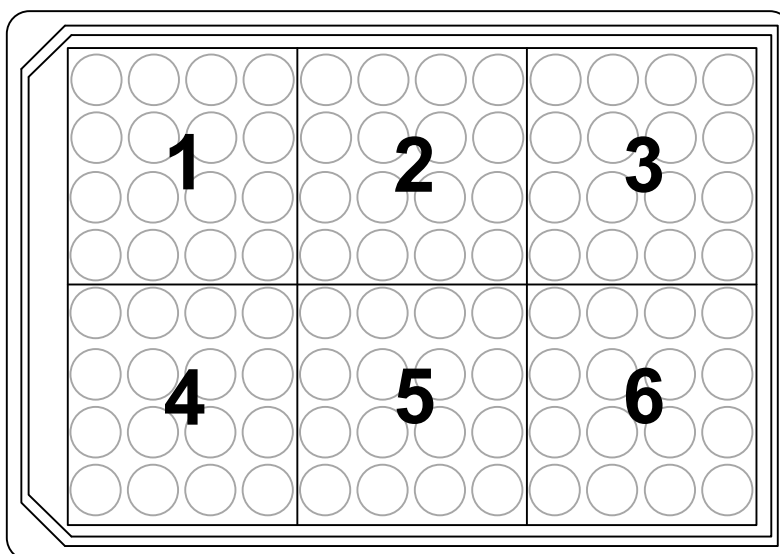
- **The two-stack, stand-alone workstation mode** uses input and output stack tubes for loading and unloading.
- **The one-position, single plate handling mode** uses the single plate adaptor in the input side for both loading and unloading single plates. The plate can be loaded either manually or by robotic plate handling equipment. In this mode, the stacker cover plate should be placed over the interface for safety.
- **The two-position, single plate handling mode** uses a single plate adaptor on the input side for loading, and a second single plate adaptor (if purchased) or stack tube on the output side for unloading.
- **The single-plate loading and stack-unloading mode** uses the single plate adaptor on the input side for loading and a stack tube on the output side for unloading.

See Section 6.3 **Robotics Integration** for general information on robotic operational modes.

3.9 Image Readout

The SECTOR S 600 uses a CCD camera to obtain images of the plate during detection. One advantage of imaging detection is that the time required to read a plate is independent of the format of the plate (i.e., it is independent of the number of wells/plate or spots/well). SECTOR S 600 reads plates in sectors to improve sensitivity and optical detection efficiency. The instrument reads plates in 6 sectors at a rate of approximately 70 seconds per plate (Figure 3:10).

Figure 3:10 The SECTOR S 600 reads 96-well plates in six sectors



3.10 MESO SECTOR Demonstration Test Plate

Each SECTOR S 600 instrument is shipped with one demonstration plate. This demonstration plate verifies operation of the system and can be used for operational qualification (OQ). It does not verify performance qualification (PQ) and is not meant to be used for calibration purposes. It should be used to verify the function of the SECTOR S 600 without the need for liquid reagents. The demonstration plate consists of an electronic circuit board housed in a plastic carrier in the shape of a standard plate. The circuit board for the SECTOR S 600 has six separate sectors, simulating the structure of MSD MULTI-ARRAY plates (Figure 3:11) as read by the SECTOR S 600.

Figure 3:11 MESO SECTOR Demonstration Test Plate

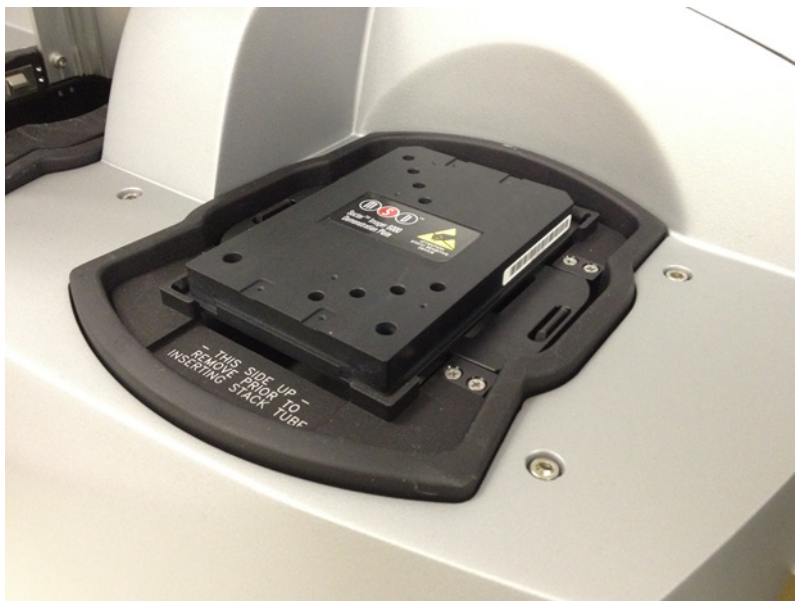


For the SECTOR S 600, sectors 3 and 4 of the demonstration plate have LEDs that test the CCD camera in the instrument. The remaining four sectors of the plate contain known electronic components for testing the electrical functioning of the instrument across its range of operation. The demonstration plate can be used without any chemical reagents, either to check instrument function at the start of each day or as a tool for demonstrating the instrument and software to new users.

Store the demonstration plate in its custom case when not in use, and keep the demonstration plate clean and free of dust and debris.

To use, place the demonstration plate in the single plate adaptor with the chamfered corners of the plate facing into the instrument (Figure 3:12). This orientation ensures that the bar code reader can automatically read the bar code label. See Section 5 **Quick Start** for more details.

Figure 3:12 Loading a demonstration plate



3.11 Uninterruptible Power Supply

The SECTOR S 600 should be operated with an uninterruptible power supply (UPS) to ensure the integrity of data in the event of power line transients.


The UPS required will depend on the standard operating voltage at your laboratory's location. Please ensure that the proper UPS is employed for the power conditions in your country and local area.


NOTE: Although the SECTOR S 600 has been tested and complies with applicable electrical standards, operation of the system with a UPS is *strongly* encouraged for uninterrupted operation and protection from power line interference.


Installation

4 Installation

A qualified MSD Service Engineer must install and configure the SECTOR S 600 before use. Installation includes setup, connection of the instrument to its computer system, and verification that the instrument is functioning properly. Only the computer provided with the instrument and configured by an MSD Service Engineer should be used to operate the SECTOR S 600.

 **CAUTION:** Installation of additional software on the computer system used to operate the SECTOR S 600 is not supported. Specifically, updating aspects of the operating system or installing any software that changes parameters of the computer environment could interfere with proper operation of the instrument software.

 **CAUTION:** Running virus-checking software, screen-savers, maintenance software, network-security software, and possibly other software on the SECTOR S 600 computer could cause conflicts with the operation of the instrument software.

 **CAUTION:** Use of other applications while plates are being read may interfere with system performance. Use of operating system power features that disable USB communication, such as Hibernate or Sleep, will cause the system to stop responding; a power off/on cycle of the instrument and PC is required to restore function.

MSD Instrument Service should be consulted prior to moving the instrument.

Quick Start

5 Quick Start

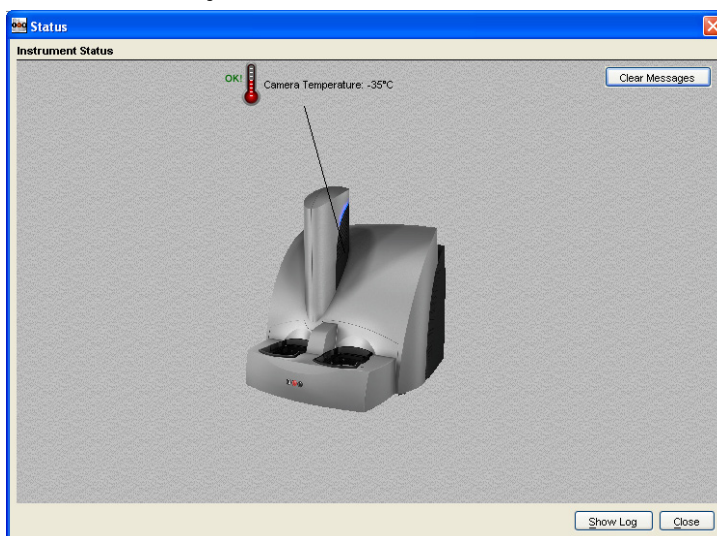
This chapter will guide you through running the MESO SECTOR demonstration plate and verifying that the instrument acquires data and functions properly. Running the MESO SECTOR demonstration plate at the start of each day may be part of standard operation.

The SECTOR S 600 has a cooled CCD camera that needs to be brought to operating temperature before plates are read. To initiate the cooling process, the SECTOR S 600 must be turned on, the MSD DISCOVERY WORKBENCH software must be started, and the SECTOR S 600 Tools must be running (see steps 1–4 below). Simply turning on the instrument will *not* initiate CCD camera cooling. If the instrument has been off, allow at least 45 to 60 minutes for the CCD camera to cool when restarting. Operating temperature of $-35 \pm 1^\circ\text{C}$ must be reached before the DISCOVERY WORKBENCH software will allow the processing of any plates.

The Status window displays the temperature of the CCD camera while it is cooling (Figure 5:1). Once the CCD camera has reached its operating temperature, the temperature indicator will disappear, indicating that the instrument is ready for use. (The status window is accessible by selecting Tools from the menu bar in the DISCOVERY WORKBENCH software.)

NOTE: If the SECTOR S 600 has been idle, but has not been shut down (i.e., is in standby mode), then the CCD camera will already be at the proper temperature, and users may skip to Section 5.2 Setup.

Figure 5:1 Instrument Status window



5.1 Start-up

To start the system:

1. Turn on the SECTOR S 600 and the computer connected to it. If a robot is connected, the startup sequence is SECTOR S 600, then the robot, then the computer.
2. Log on to the Windows operating system. To do this, enter *Administrator* as the user login name and *MsdAdmin* as the password. (This is the default login shipped with the system; you may change this login/password or add additional Windows user accounts.)

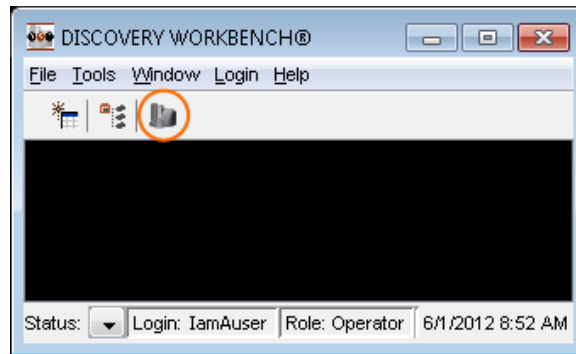
3. If DISCOVERY WORKBENCH does not start automatically, double-click the MSD DISCOVERY WORKBENCH icon on the Windows desktop (Figure 5:2).

Figure 5:2 MSD DISCOVERY WORKBENCH desktop icon



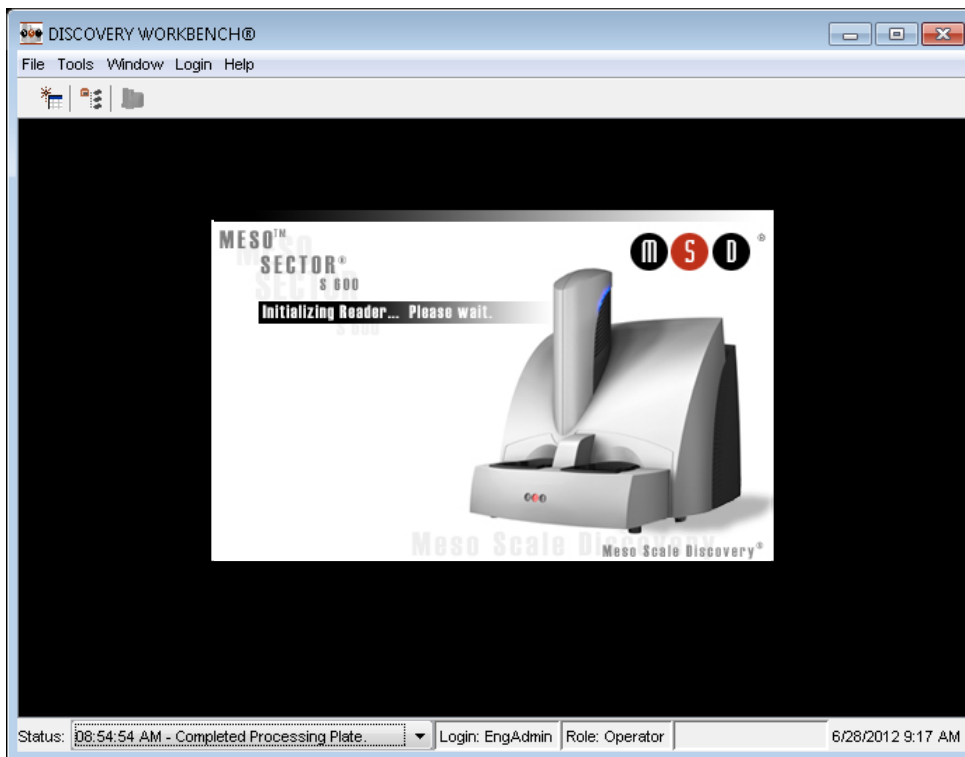
4. Click the instrument icon (Figure 5:3) on the toolbar to connect to the reader and initiate the CCD camera cooling process.

Figure 5:3 SECTOR S 600 icon



The SECTOR S 600 splash screen (Figure 5:4) will display while the instrument is initializing. If the instrument has just been powered-up, the cooling process will take approximately 45 to 60 minutes.

Figure 5:4: MSD DISCOVERY WORKBENCH splash screen



5.2 Setup

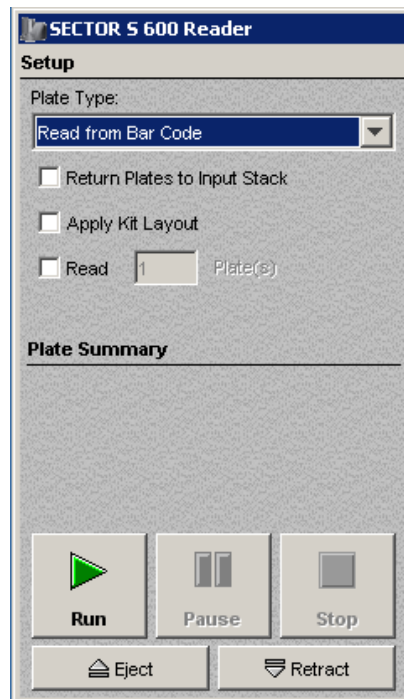
On the left side of the SECTOR S 600 window, users can view and edit the Setup selections for the demonstration plate read (Figure 5:5).

1. Select Read from Bar Code from the Plate Type menu.
2. Select the Return Plates to Input Stack checkbox. If left unchecked, the demonstration plate will be placed in the output stack on the left side of the SECTOR S 600 after reading. Because the demonstration plate will be run as a single plate, it is most convenient to return it to the input stack after processing.

NOTE: It is very important to select Return Plates to Input Stack checkbox when the stacker cover plate is on the output stack so that the SECTOR S 600 will not attempt to place the plate into the covered interface at the end of the read.

3. Leave the Apply Kit Layout box unchecked. This option is covered in DISCOVERY WORKBENCH User's Guide.
4. Select the Read ___ Plate(s) checkbox and enter 1 in the text field.

Figure 5:5 SECTOR S 600 Window: Setup, Plate Summary, and Operations areas



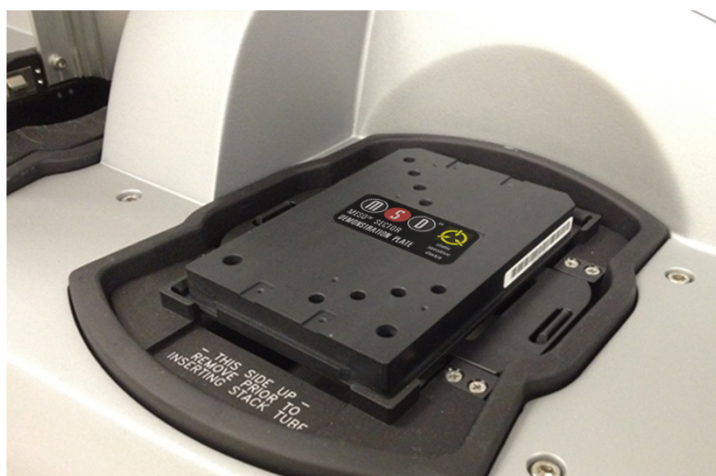
5. Place the single plate adaptor on the input (right) stacker interface plate (Figure 5:6).

Figure 5:6 Stacker cover over the output port with empty single plate adaptor in the input port



6. Load the MESO SECTOR demonstration plate into the single plate adaptor (Figure 5:7). (Sensors in the instrument will automatically identify the plate orientation and adjust the data acquisition and analysis accordingly.)

Figure 5:7 MESO SECTOR demonstration plate in the single plate adaptor



NOTE: If the SECTOR S 600 is unable to read the barcode on the demonstration plate (or if no barcode label is present), the plate will be skipped and ejected from the instrument. Please contact MSD Scientific and Technical Support for assistance.

5.3 Run

When the camera reaches proper operating temperature, the Instrument Log (click Show Log in the Status window) will indicate that the temperature is locked. At that point, the instrument is ready.

Click Run in the SECTOR S 600 window. The Run Options dialog window will open (Figure 5:8).

1. Verify Setup Selections. If changes are necessary, click Cancel, make changes in the area (5.2 Setup) of the SECTOR S 600 window, and re-verify Setup Selections.
2. Run name is optional, but one can be entered in the second section.

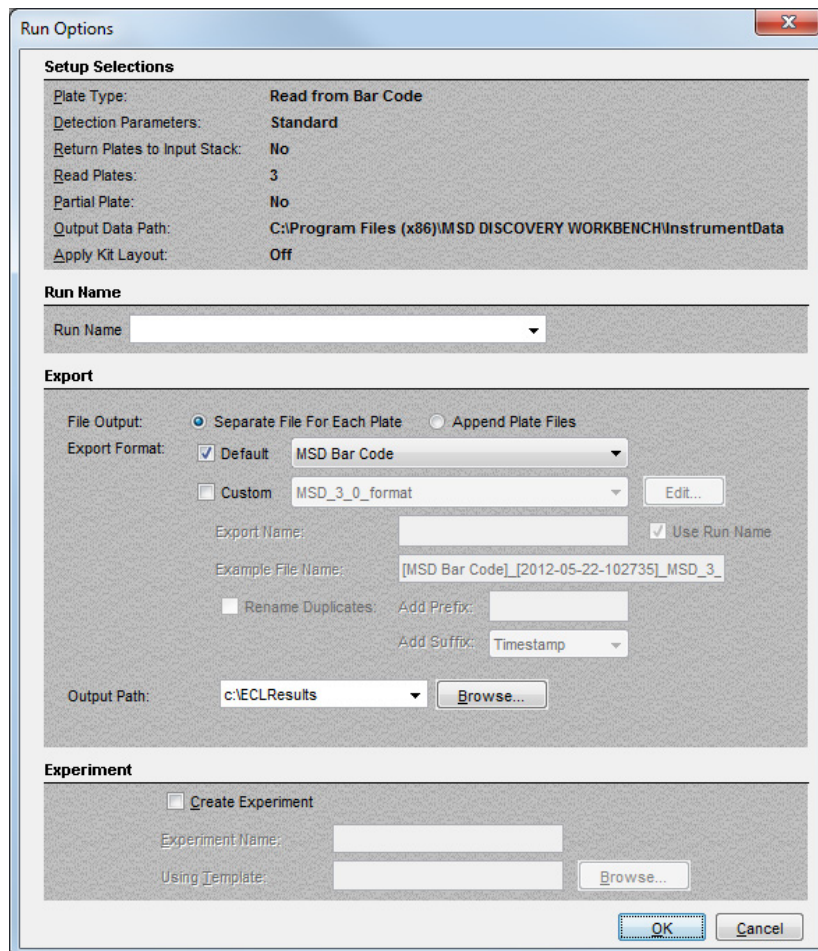
3. Verify the Export information and make changes if necessary. (Refer to the DISCOVERY WORKBENCH User's Guide for additional details.) The export selections control the format and the location of the exported text data file that will be created when the demonstration plate is read.
4. Click OK. The plate read starts. View the status in the lower left region (Status bar) of the DISCOVERY WORKBENCH software to monitor progress. When the plate read is complete, the demonstration plate is returned to the stacker and Run is enabled again.

5.3.1 Operations

The Pause, Stop, Eject, and Retract buttons operate the motion control system that moves plates through the instrument.

- **Pause.** Pauses the plate read. Selecting Pause again resumes the read.
- **Stop.** Stops the current run and ejects any plate inside the instrument.
- **Eject.** Transfers a plate from inside the instrument (but not being read) to the stacker output port where it may be retrieved. This function is disabled during a plate run.
- **Retract.** Moves a plate from the input port into the instrument. No further action is taken without input from the operator. This function is disabled during a plate run.

Figure 5:8 SECTOR S 600 window, Run Options dialog box

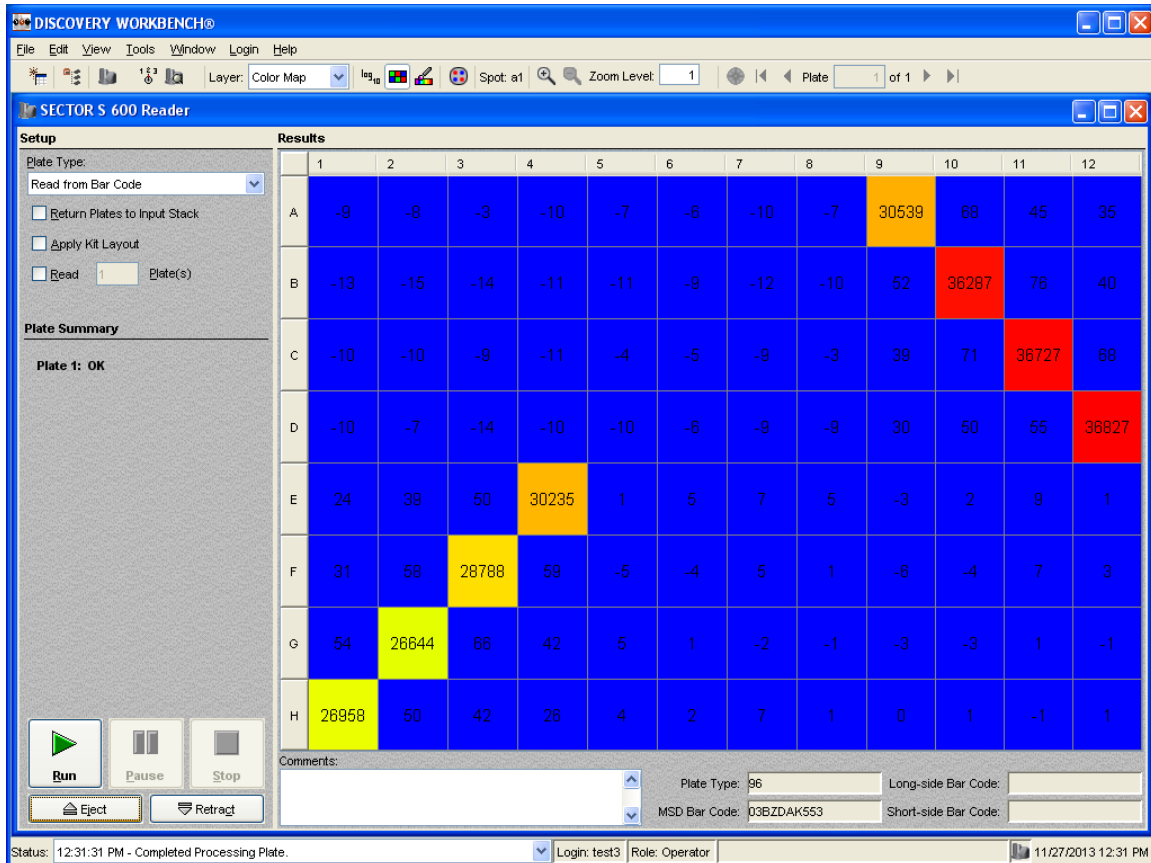


5.4 Results

The software provides several options for viewing results. Select View → Layer Views from the menu or select a layer from the Layer menu on the toolbar. Refer to the DISCOVERY WORKBENCH User's Guide for details on data viewing options. If you observe the data as it is acquired in Color Map view, bright wells should display numbers above 2000 and dark wells should display numbers below 200.

Figure 5:9 shows a Color Map view of the data from the demonstration plate.

Figure 5:9 Demonstration plate results, Color Map layer



When using the MESO SECTOR demonstration plate sectors 3 and 4 (Figure 3:10) should display four bright wells each, as shown in Figure 5:9. Sectors 1, 2, 5, and 6 should have uniform, low signal levels corresponding to instrument background.

Using the SECTOR S 600

6 Using the SECTOR S 600

This chapter explains how to prepare and load single or multiple MULTI-ARRAY plates for typical use with the SECTOR S 600. Additional information is provided to integrate the instrument with an external, third-party robotic system. Please refer to the DISCOVERY WORKBENCH User's Guide for detailed instructions on running MULTI-ARRAY plates on the SECTOR S 600 system.

NOTE: This section assumes that a qualified MSD Service Engineer has installed and configured the instrument, and that the user has run a demonstration plate as described in the previous section.

6.1 Single Plate Run

To run a single MULTI-ARRAY plate, place the single plate adaptor in the right stacker interface (Section 3.5 The SECTOR S 600 Instrument).

The right stacker interface can act as both input and output locations. If not using the output (left) interface, place the stacker cover plate over it. The SECTOR S 600 will pull and eject plates from/to the input (right) interface.

If using the output side, install a second single plate adaptor or a stack tube on the output (left) stacker interface plate. The SECTOR S 600 will automatically pull plates from the right side and eject plates into the left side.



If the stacker cover plate is present on the output stack, remember to select the Return Plates to Input Stack checkbox so that the SECTOR S 600 will not attempt to place the plate into the covered stack at the end of the read.

Prepare the MULTI-ARRAY plate using the required reagents per the assay protocol. Place the plate into the single plate adapter. Sensors within the instrument will automatically identify the plate orientation and compensate the data acquisition and analysis accordingly. Per the detailed instructions in the DISCOVERY WORKBENCH User's Guide, configure the options in DISCOVERY WORKBENCH and run the plate.

6.2 Stack Run—Multiple Plates

Multiple plates may be loaded into SECTOR S 600 instrument using the standard or high-capacity stack tubes (Figure 3:4). SECTOR S 600 reads plates from the bottom of the stack tube.

6.2.1 Loading the Stack Tube

Prepare MULTI-ARRAY plates using the required reagents per the assay protocol.

To load prepared plates into the stack tube:

1. Stack plates on a stable surface.
2. Place the stack of plates on top of an extra, standard 96-well MULTI-ARRAY plate. This extra plate serves as a spacer for loading (Figure 6:1).
3. Orient the stack tube so that the corners of the plates are toward the back of the instrument and the bar code labels are to the left.

NOTE: A label on the inside of the stack tube reminds users of the correct orientation for loading plates. The stack tube itself will only fit on the interface plate in one orientation.

4. Slide the stack tube carefully over the top of the stack of plates such that the plates slide into the tube. Once the stack tube base is flush with the stable surface, all but the extra plate will be loaded into the stack tube (**Figure 6:1**).
5. Remove the single plate adaptor if it is present on the stacker.
6. Place the full stack tube on the input (right) stacker interface plate.
7. Place an empty stack tube of the same size on the output (left) stacker interface plate.

Figure 6:1 Loading MULTI-ARRAY plates into stack tube



If the stack of plates to be run is too tall for the above procedure, you can insert the additional plates through the top of the stack tube (up to the stack tube capacity) during the run. Be careful to not to add more plates than can be accommodated in the output stack tube.

CAUTION: When reading multiple plates in a run, ensure that the stack tube is not overloaded. See [Table 3:1 Stack Tube plate capacities](#).

WARNING: Loading a tall stack of plates could lead to spilling potentially harmful chemical reagents. Use caution when loading the stack tubes.

6.2.2 Unloading the Stack Tube

After running a stack of plates, the consumed plates will be located in the output stack tube. These plates should be unloaded and properly disposed of prior to running additional plate stacks to prevent the possibility of overfilling the output stack tube.



CAUTION: Not removing the completed plates from the output stack may cause spills if the number of completed plates exceeds the capacity of the output stack.



The plates should be removed manually by sliding them up and out the top of the stack tube. The last few plates can be accessed by pushing the last plate up from the bottom of the stack tube.

6.3 Robotics Integration

The SECTOR S 600 instrument can be integrated with a robotics system for loading and unloading plates using the Remote Instrument Mode, which allows the instrument to be used as a component through its remote interface. A Remote Instrument Manual that provides descriptions of the commands recognized by the MSD software is available upon request. Contact **Scientific and Technical Support** for more information on robotics integration.

Maintenance

7 Maintenance

This chapter contains basic maintenance instructions for the SECTOR S 600 and some components. A qualified MSD Service Engineer should perform all other maintenance procedures not described in this section.

 **WARNING:** Opening the instrument to perform maintenance incurs risk of mechanical, electrical, and laser harm.

The SECTOR S 600 instrument requires proper care, including occasional preventive maintenance. Only MSD Service Engineers should perform standard preventive maintenance on the instrument. The schedule for these procedures depends on the usage of the instrument.

Please perform periodic system maintenance on the computer in order to maintain high performance. This includes running the defragmentation program included with the operating system on a regular basis. A performance qualification kit containing plates, reagents, and a protocol for verifying instrument performance, is available for purchase (MSD catalog #R31QQ-3). MSD **Scientific and Technical Support** can provide more details on the performance qualification kit.



Inspect the SECTOR S 600 before and after each use to ensure that there is no debris (liquid, dirt, plastic items, etc.) on or near the stacker interface plate. Clean the SECTOR S 600 after each use as described below.

7.1 Preventive Maintenance

Scheduled maintenance should include the cleaning and lubrication of all appropriate internal components. Only MSD Service Engineers should perform this maintenance, usually once every 6 months.


Contact MSD **Customer Service** to ask about our service contracts.

7.2 Instrument Cleaning

Reasonable care should be taken to prevent unnecessary fluid spills onto and into the SECTOR S 600. Any spills onto the instrument should be promptly cleaned using either water, 70% ethanol, 1% bleach in water, or a mild detergent. Choose a cleaning solvent that is appropriate for the nature of the spill. Lint-free cleaning wipes are recommended for this cleaning.

 **CAUTION:** The instrument should be turned off and unplugged for all cleaning processes.

Any of the outside surfaces of the SECTOR S 600 can be cleaned. In addition, accessible regions of the stackers and elevators can be cleaned. The stackers should only be cleaned when the power is disconnected.

 **WARNING:** When the stack tubes are removed, the plate elevator and doors to the instrument pose a pinch hazard. Do not put hands into these regions while the instrument is powered-up.

If chemical reagents are spilled inside the light tight enclosure of the SECTOR S 600, contact MSD **Instrument Service** for instructions.

7.2.1 Adapter and Stack Tube Cleaning

Spills on single plate adapters or stack tubes should be promptly cleaned to prevent a build-up of crystalline debris or dried salts that could interfere with their operation. In particular, plates may not load correctly if the latch movement of these devices is compromised.

Clean dirty latch mechanisms by soaking the latches in warm water (approximately 104°F/40°C) with a small amount of residue-free detergent for 15 minutes. Rinse the latches thoroughly with running water, tip and/or shake gently to remove excess liquid, and allow to fully air dry. If there is any residue remaining, soak the latches in a 70% alcohol solution (isopropanol or ethanol in water) for 15 minutes; shake out the excess, and allow to air dry completely. If plate-loading problems persist, contact **Scientific and Technical Support**.

7.3 Instrument Decontamination

Contact MSD **Scientific and Technical Support** for a detailed protocol for instrument decontamination.

NOTE: The SECTOR S 600 must be decontaminated prior to shipping the instrument back to MSD. Contact MSD **Scientific and Technical Support** prior to shipping for instructions and requirements.

Appendix

8 Appendix

8.1 Troubleshooting Guide

Refer to [Table 8:1](#) below to troubleshoot hardware and operating errors. The software version may be found in Help → About Workbench.

Table 8:1 Troubleshooting guide

Symptom/Error message on screen	Possible Cause	Corrective Action
Instrument or computer does not power on	Loose or disconnected power cable(s)	Ensure that the cables connecting the instrument and/or computer to the external power source are plugged in properly.
	No voltage at outlet	Test the outlet by connecting a different electrical device to the outlet.
	One or more fuses activated	Fuse locations and specifications for the instrument are shown in Section 8.2.4: Power Requirements .
The plate passes through the instrument without being read. The status window jumps from 1% to 100%.	The instrument was unable to read the barcode on the plate. The bar code may be damaged, smudged, marked, or otherwise unreadable.	Verify a bar code is smoothly affixed to the side of the plate. Then, select the appropriate plate type from the pull-down menu, and read the plate again.
Error 515 General error The instrument failed to read the plate after clicking the Run button.	Windows security settings, networking parameters, or the instrument name has changed.	Click OK to continue. Determine whether your IT department has made any changes to the instrument computer recently.
	Incompatible anti-virus software has been installed on the instrument computer.	Disable the antivirus program temporarily to see if that is the issue. There are several methods: <ol style="list-style-type: none"> 1) Exclude the file: C:\Program Files\MSD Discovery Workbench\lib\prefs.properties from scanning. 2) Disable real-time scanning. 3) Uninstall the antivirus program and use a different one.
Error 515 General error The instrument failed to initialize after clicking the instrument icon.	The Windows theme has changed.	Click OK to continue. Restore the default Windows theme. Please check whether your IT department has made any changes to the instrument computer recently. The sysinfo file contains a software log that can be used to diagnose the problem. The log will contain errors such as .JCodeException: Error creating plugin: unknown and CreatePluginAction\$1 doWork:-1 and lifesci.usersrv.ipr.IPRReader\$IprReaderVetoCloseController vetoClose:-1.
Error 515 General error The error was noted while reading a plate or during data analysis.	The Plate Data History (database) is full.	Click OK to continue. Backup and clear the database. Instructions on backing up and clearing the database can be found in the DISCOVERY WORKBENCH User's Guide. The software log will contain a message such as: Could not allocate space for object 'PIDTable'in database 'LCPRSchema' because the 'PRIMARY' filegroup is full.
Error 6106 Instrument initialization failed	The instrument or computer has experienced a communications failure.	Perform the following steps: <ol style="list-style-type: none"> 1) Shut down the computer 2) Shut down the SECTOR S 600 3) Restart the computer 4) Restart the SECTOR S 600
Error 7254 Hardware fault	A fault was detected in the camera or camera controller. This error can be caused by a blown fuse internal to the camera power supply, a fault with camera USB communication, or a disconnected cable.	Check that all connections are tight, particularly USB cables runs from the instrument to the back of the computer. If no loose cables can be found and the instrument still fails to function after restarting, contact Instrument Service for assistance.

Symptom/Error message on screen	Possible Cause	Corrective Action
Error 7461 Instrument not ready when starting a plate run.	The camera has not reached the proper temperature for operation. The SECTOR S 600 camera will cool to -35°C, before the instrument becomes operational.	Check the camera cooling status (Tools → Status) The temperature should be dropping toward the operating temperature. Wait up to 60 minutes for the camera to stabilize at the correct temperature. This is a normal function of turning on the instrument. Restart the software. Check the temperature again. Contact MSD Scientific and Technical Support if the camera temperature is not dropping.
Error 8704 The MSSQL\$Mesoscale1 or SQL Server (MESOSCALE2) service has not started	The Windows service has not started.	It may take up to five minutes for this service to start after the computer is started. If the error is caused because DISCOVERY WORKBENCH was launched before the service started, then restarting the software will resolve it. If the service has been interrupted: 1) Right-click My Computer on the desktop and select Manage. In the Computer Management window under Services and Applications, click Services. 2) In the alphabetical list of services, right-click SQL Server (MESOSCALE2) and select Restart.
Error 8906 Invalid Plate Type	A discontinued plate or a plate configuration exclusive to another instrument was used.	Discontinued plates cannot be run. In addition, plates made for other MSD instruments may be incompatible with the SECTOR S 600 instruments.
Error 9460 Instrument timed out	Communication between the instrument and the computer has been interrupted.	Check the cables attached to the instrument and computer to make sure they are correct and seated securely. Contact Instrument Service. Customers may be asked to provide log files from the folder C:\Program Files\MSD DISCOVERY WORKBENCH\log
Error 9711 Unable to connect to the instrument server	Loose cables prevent communication between the instrument and computer.	Check the integrity of all cables going into the SECTOR instrument and the desktop computer.
	Communication between the instrument and computer has been interrupted.	Restart the computer. Restart the communication service by navigating in Windows to Control Panel → Administrative Tools → Services. Right-click the service SQL Server (MESOSCALE2) for DISCOVERY WORKBENCH v4 and select either Restart or Start.
Error 9901, 9902 Communications failure	The instrument lost communication with the computer.	Ensure that both the instrument and computer are powered on and all power and communications cables connected and secure. Close DISCOVERY WORKBENCH and restart the computer. If restarting does not correct the problem, then switch the location of the instrument-to-computer USB cable by plugging the USB cable into a different USB port on the instrument computer. 1) Turn off the SECTOR S 600. 2) Wait 30 seconds. 3) Turn on the SECTOR S 600. 4) Restart the computer. 5) Wait five minutes before starting the MSD DISCOVERY WORKBENCH software. If the problem is not resolved, contact Scientific and Technical Support.

8.2 Specifications

8.2.1 SECTOR S 600

NOTE: All performance information including standard signal levels, detection limits, dynamic range, and instrument noise is based on 150 µL read volumes in 96-well MULTI-ARRAY plates using standard plate read parameters.

8.2.2 Scientific Performance

Table 8:2 Scientific performance

	SECTOR S 600
Standard Signal Levels Signals generated by Free TAG, 15,000 [Cat # R31QQ-3] Signals generated by PQ Low Control [Cat # R31QQ-3]	12,000–18,000 counts 25–100 counts
Dynamic Range	10 ⁶
Electronic Noise Standard Deviation Dark Noise (depends on plate type)	≤ 16 counts

8.2.3 Environmental Specifications

Suggested Operational Temperature Range	20–26 °C (68–78 °F)
Suggested Operational Humidity Range	10–80% non-condensing
Storage Temperature Range	5–40°C (41–104 °F)
Storage Humidity Range	5–85% non-condensing
Ambient Light	<2000 Lux

8.2.4 Power Requirements

Voltage	100–240 V~ 50/60 Hz
Current	3.5A–2.8A @ 100–240 V~

Class I, Installation (Overvoltage) Category II Device



Fuses

Electrical fuses are only accessible by MSD Service Engineers and are not user-serviceable. The information below is provided for reference.

Main Fuses F1 and F2:

T4.0 A, 250 V, 100–240 V~

8.2.5 SECTOR S 600 Physical Dimensions

Size	26.8 in x 30.5 in x 33.9 in (68.1 cm x 77.5 cm x 86.1 cm)
Weight	150 lbs (68 kg)

8.2.6 Plate Standard Read Volume (per Well)

96-well MULTI-ARRAY Plates	150 µL
384-well, MULTI-ARRAY Plates	40 µL
1536-well, MULTI-ARRAY Plates	4–6 µL

8.2.7 Custom Bar Code Compatibility*

Code 39
Code 128

*Contact MSD [Scientific and Technical Support](#) for information on proper label, font size, and location of custom bar code on plate. Recognition of additional codes is possible but has not been tested.

8.2.8 Plate Specifications

MSD MULTI-ARRAY and MULTI-SPOT plates are designed to comply with the mechanical dimensions of the proposed standards of the Society of Biomolecular Screening. Contact MSD [Scientific and Technical Support](#) for further details.

The MULTI-ARRAY and MULTI-SPOT plate bar code labels conform to the ANSI/AIM BC1—1995: Uniform Symbology Specification—Code 39 format.

8.3 Regulatory and Safety Certifications

The SECTOR S 600 has been tested to comply with applicable regulatory standards: TUV (Canada, US), TUV-GS, CE approved, CB Certification.

Regarding EN61326 Electrical Equipment for Measurement, Control, and Laboratory Use—EMC Requirements. (EMCD) Annex B:

- SECTOR S 600 unit is designed for operation in a controlled electromagnetic environment. Transmitters of RF energy such as mobile (cellular) telephones should not be used in close proximity.

Regarding FCC Rules, Part 15, Subpart B, as a Class A digital device:

- This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. The equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case, users will be required to correct the interference at their own expense.

Regarding Industry Canada Interference-Causing Equipment Standard:

- This Class A digital apparatus complies with Canadian ICES-003.
- Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada.








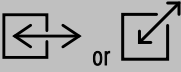
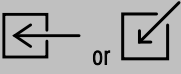
Contact MSD **Scientific and Technical Support** with inquiries about the regulatory compliance of MSD instrumentation.

8.3.1 WEEE Compliance

For all inquiries regarding recycling of shipping materials, instrument disposal, and WEEE-related issues, please contact an MSD instrument service specialist at 301.947.2057 or instrumentservice@mesoscale.com.

8.4 Symbols and Labels

Table 8:3 Symbols and labels

Symbol/Label	Description
	Consult accompanying documentation/written warning
	Device contains high voltages
	Pinch Hazard Warning
	Accessible fuse with rating
	Class 2 Laser Warning
	Electrostatic Sensitive Device
V	Volts
A	Amps
~	Alternating Current
	On
○	Off
◦	Halt plate motion system
CE	European Compliance Mark Indicates that the device complies with applicable European Directives
	USB I/O Port Symbol and Reference Designation
	Camera Controller Serial I/O Port Symbol and Reference Designation
O O	Bar Code Reader RS-232 I/O Port Symbol and Reference Designation
	External Stop or Pause Control I/O Port Symbol



Technical Support

9 Technical Support

MSD provides excellent and timely support for all authorized users of SECTOR S 600. We welcome and carefully consider all bug reports and suggestions for improvements to future versions. We will work with you to resolve any problems you may encounter.

9.1 Bug Reports and Suggestions

Please send comments or feedback on the software—including bug reports, unresolved error codes, feature requests, or design change requests—to an MSD Scientific and Technical Support specialist.

9.2 Problems Running SECTOR S 600 Instruments

If you encounter an error report that you cannot resolve, please provide us with as much of the following information as possible:

- The error code and text in the error dialog box
- What you were doing when the error occurred
- How can the error be reproduced?
- If requested by MSD Scientific Support, a copy of the SysInfoOutput.txt file located in C:\sysinfo

To generate the report file, first run the SysInfo.exe diagnostic tool located in:

(WinXP/Win7-32 bit) C:\Program Files\MSD DISCOVERY WORKBENCH\bin

(Win7-64 bit) C:\Program Files (x86)\MSD DISCOVERY WORKBENCH\bin

Email this information to scientificsupport@mesoscale.com. Someone will contact you within two business days. If the error is affecting your work, please mark it URGENT and we will respond as quickly as possible.

9.3 How to Contact Us

Meso Scale Diagnostics, LLC, company headquarters is located at:

1601 Research Boulevard
Rockville, Maryland 20850 USA
+1 240-314-2600

Our website is www.mesoscale.com.

Customer Service
+1 240-314-2795
customerservice@mesoscale.com

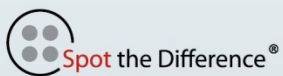
Scientific and Technical Support
+1 240-314-2798
scientificsupport@mesoscale.com

Instrument Service
+1 301-947-2057
instrumentservice@mesoscale.com



1601 Research Blvd. Rockville, MD 20850 USA Phone: 1.240.314.2795 Fax: 1.301.990.2776 Website: www.mesoscale.com

MESO SCALE DISCOVERY, MESO SCALE DIAGNOSTICS, MSD, DISCOVERY WORKBENCH, MULTI-ARRAY, MULTI-SPOT, QUICKPLEX, SECTOR, SECTOR PR, SECTOR HTS, SULFO-TAG, V-PLEX, STREPTAVIDIN GOLD, MESO, www.mesoscale.com, SMALL SPOT (design), 96 WELL 1, 4, 7, & 10-SPOT (designs), 384 WELL 1 & 4-SPOT (designs), MSD (design), V-PLEX (design), and SPOT THE DIFFERENCE are trademarks and/or service marks of Meso Scale Diagnostics, LLC. ©2013 Meso Scale Diagnostics, LLC. All rights reserved.



www.mesoscale.com®