

Ion Chef™ System and Ion GeneStudio™ S5 System

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This guide contains the information that is needed to prepare your site for installation of an Ion GeneStudio™ S5 System, Ion GeneStudio™ S5 Plus System, Ion GeneStudio™ S5 Prime System, or Ion Chef™ System. An external Ion Torrent™ Server is required for use with the Ion GeneStudio™ S5 Prime Sequencer and is included in the Ion GeneStudio™ S5 Prime System.

Note: In this guide, Ion GeneStudio™ S5 Sequencer or System refers generically to the series of three Ion GeneStudio™ S5 Sequencers or Systems, unless otherwise specified.

The Ion S5™ System and the Ion S5™ XL System are no longer available for purchase and are replaced by the Ion GeneStudio™ S5 System and Ion GeneStudio™ S5 Prime System, respectively. Both of the Ion S5™ and Ion S5™ XL Sequencers continue to be supported by Thermo Fisher Scientific. See the *Ion S5™ and Ion S5™ XL System Site Preparation Guide* (Pub. No. [MAN0010810](#)) for site preparation information for these systems.

Site preparation workflow

A Thermo Fisher Scientific service representative will contact you to schedule the installation. When the installation date is scheduled, perform the following tasks.

Site preparation workflow	
Review this site preparation guide	
Complete the site preparation checklist (page 3) Complete, date, and initial all items in the checklist before the scheduled installation date.	
Receive and inspect the shipment (page 25) • Verify items ordered were shipped. • Inspect the shipping containers and report any damage. • Unpack the installation kit and store as directed.	
Move the crated shipment to the installation site (page 25) • Prepare the installation site. • Move the crated instrument to the site.	

Installation timeline and training

After your sequencer is uncrated, installation and testing of the Ion GeneStudio™ S5 Sequencer, Ion GeneStudio™ S5 Plus Sequencer, or Ion GeneStudio™ S5 Prime Sequencer and Torrent Server (required for use with the Ion GeneStudio™ S5 Prime Sequencer) takes ~8 hrs.

The Ion Chef™ System can be installed as part of the sequencing workflow configuration. Installation requires an additional 4–6 hours.

During or after installation, the Thermo Fisher Scientific service representative reviews data and provides basic operator training. For more training and reference information, see the user documents that are provided with the system.

Site preparation checklist

IMPORTANT! Complete, date, and initial all items in the following checklist before the scheduled installation date. If the site preparation checklist is not complete when the Thermo Fisher Scientific service representative arrives, the scheduled installation can be postponed.

✓	Date	Initials	Site preparation requirement	See page
☐			Customer responsibilities have been reviewed and personnel have been assigned.	4 –5
☐			The installation site is identified and meets requirements:	
			☐ Space and clearance	5
			☐ Environmental	13
			☐ Electrical	17
			☐ Network	20
			☐ Safety	23
☐			All materials needed for installation and operation are available.	23
☐			The instrument was received and inspected:	25
			☐ All items on the shipping list are the same items ordered at the time of purchase.	
			☐ Any damage to shipping containers was reported to the shipping company that delivered the instrument.	
			☐ Any damage or mishandling was recorded on the shipping documents.	
			☐ The reagents box was unpacked and stored as specified.	
☐			The installation site is cleared and ready for instrument installation.	25
☐			The crated instrument and other shipping containers are moved to the installation site.	

Customer responsibilities

Personnel	Responsibilities
Site preparation/ installation coordinator	• Reviews the site preparation guide for safety information and instrument requirements. • Coordinates personnel and tasks. • Chooses the site. • Reviews checklists with applicable personnel, then with the service representative to verify that the site is properly prepared. • Receives and inspects the instrument. • Stores the reagents box according to the specifications indicated in the product inserts. • Schedules the installation and informs personnel of the installation day. • Ensures that the site is clear of unnecessary material on the installation day. • Is available to assist the service representative throughout installation.
Laboratory safety representative	• Reviews the site preparation guide for safety information. • Ensures that the required safety practices and equipment are in place. • Is in the vicinity and available to the service representative at all times while the service representative is at the customer's facility.
Laboratory personnel/ primary users	• Review safety information. • Ensures that all customer-provided materials for installation are present at the site. • Ensures that primary users (responsible for training other users) are available during the installation, so that they can be trained on the instrument.
Facilities personnel	• Ensures that the installation requirements are met for: – Space at the installation site – Building clearances – Temperature and humidity – Waste collection – Electrical supply – Computer – Safety and installation materials • If possible, moves the crated instrument to the site before the installation date. • Is available to assist service representative and laboratory personnel throughout installation. • If applicable, ensures that at least two people are available to help the service representative move and position the instrument.

(continued)

Personnel	Responsibilities
Network or IT specialist (if the instrument will be connected to a network)	- Ensures that active, tested local area network (LAN) connections are in place before the scheduled installation date. - Ensures that network hardware is compatible with an RJ45-type connector. - If necessary, supplies additional cables. - Is available during installation to connect the instrument to the network. - If applicable, provides and installs a network or dedicated printer. IMPORTANT! Do not attempt to connect the instrument components to the network before the service representative arrives.

Site requirements

Dimensions and weights

To prepare for installation, provide space for receipt and configuration of the components listed in this section. This section provides dimensions and weights for the packages you will receive, and it describes the dimensions of the components after installation and configuration.

Crates and packages



WARNING! PHYSICAL INJURY HAZARD. Do not attempt to lift or move the crated instrument without professional assistance. The crated instrument is heavy. Any incorrect lifting or moving of the crated instrument can cause serious injury.

Ensure the building clearances allow for the passage of the instrument crates and packages.

Crate	Height	Length (depth)	Width	Weight
Ion GeneStudio™ S5 Sequencer	25.5 in (64.8 cm)	39 in (99 cm)	28 in (71.1 cm)	200 lbs (90.7 kg)
Ion GeneStudio™ S5 Plus Sequencer	25.5 in (64.8 cm)	39 in (99 cm)	28 in (71.1 cm)	200 lbs (90.7 kg)
Ion GeneStudio™ S5 Prime Sequencer	25.5 in (64.8 cm)	39 in (99 cm)	28 in (71.1 cm)	200 lbs (90.7 kg)
Ion Torrent™ Server ^[1]	20 in (50.9 cm) with caster wheels	26.7 in (67.8 cm) with bezel	7.9 in (20 cm)	107.3 lbs (48.7 kg)
Ion Chef™ Instrument	28 in (71.1 cm)	34 in (86.4 cm)	34 in (86.4 cm)	295 lbs (134.0 kg)

^[1] Required for use with the Ion GeneStudio™ S5 Prime Sequencer.

Components

Ensure that the installation site bench space is level and can accommodate the dimensions and support the weights.

Component	Height		Length (depth)	Width		Weight
	Open	Closed		Open	Closed	
Ion GeneStudio™ S5 Sequencer	—	20 in (50.9 cm)	31.75 in (80.6 cm)	34 in (86.4 cm)	21.4 in (54.2 cm)	140 lb (63.5 kg)
Ion GeneStudio™ S5 Plus Sequencer	—	20 in (50.9 cm)	31.75 in (80.6 cm)	34 in (86.4 cm)	21.4 in (54.2 cm)	140 lb (63.5 kg)
Ion GeneStudio™ S5 Prime Sequencer	—	20 in (50.9 cm)	31.75 in (80.6 cm)	34 in (86.4 cm)	21.4 in (54.2 cm)	140 lb (63.5 kg)
Ion Torrent™ Server ^[1]	—	20 in (50.9 cm) with caster wheels	26.7 in (67.8 cm) with bezel	—	7.9 in (20 cm)	107.3 lbs (48.7 kg)
Ion Chef™ Instrument	33 in (83.9 cm)	22.1 in (56.1 cm)	27.6 in (70.0 cm)	—	28.1 in (71.4 cm)	150 lbs (68.2 kg)

^[1] Required for use with the Ion GeneStudio™ S5 Prime Sequencer.



WARNING! PHYSICAL INJURY HAZARD.

Do not attempt to lift or move the instrument without professional assistance. The instrument is heavy. Any incorrect lifting or moving of the instrument can cause serious injury.

Instrument clearances

During instrument setup and maintenance, it is necessary to access the back and sides of all the instruments. If the back of an instrument component faces a wall, it is necessary to have enough space to allow rotation of the instrument on the bench for access.

IMPORTANT! For safety, the power outlet used for powering the instrument components must be accessible at all times.

Component	Top	Front	Left/Right	Back
Ion GeneStudio™ S5 Sequencer ^[1]	12.0 in (30.5 cm)	12.0 in (30.5 cm) ^[2]	4.0 in/12 in ^[3] (10.0 cm/30.5 cm)	12.0 in (30.5 cm)
Ion GeneStudio™ S5 Plus Sequencer ^[1]	12.0 in (30.5 cm)	12.0 in (30.5 cm) ^[2]	4.0 in/12 in (10.0 cm/30.5 cm) ^[3]	12.0 in (30.5 cm)
Ion GeneStudio™ S5 Prime Sequencer ^[1]	12.0 in (30.5 cm)	12.0 in (30.5 cm) ^[2]	4.0 in/12 in (10.0 cm/30.5 cm) ^[3]	12.0 in (30.5 cm)
Ion Torrent™ Server	2.0 in (5.0 cm)	12.0 in (30.5 cm)	2.0 in (5.0 cm)	24.0 in (61.0 cm)
Ion Chef™ Instrument	14 in (35.6 cm)	6.7 in (17.0 cm)	4.0 in (10.0 cm)	12.0 in (30.5 cm)

^[1] Clearance requirements for all Ion GeneStudio™ S5 Sequencers are identical.

^[2] The instrument requires 36.0 in (90.0 cm) aisle in front of bench for operator access.

^[3] To allow sufficient clearance for the instrument door to open.

Placement of the instrument and server

If any of the instruments will be placed on a mobile bench, verify that the bench is level and meets the requirements in “Crates and packages” on page 5.

IMPORTANT! The Ion GeneStudio™ S5 Sequencer and Ion Chef™ Instrument must be installed on a level surface.

Note: Thermo Fisher Scientific is not responsible for any damage caused by using a laboratory bench that does not meet the minimum weight capacity requirements mentioned above.

Laboratory layout of the Ion GeneStudio™ S5 Sequencers, Ion Chef™ Instrument, and Ion Torrent™ Server

The Ion GeneStudio™ S5 Sequencer contains a virtual Ion Torrent™ Server, and the Ion GeneStudio™ S5 Plus Sequencer is equipped with an internal Ion Torrent™ Server. These instruments are not connected to an external Ion Torrent™ Server and only require connection to a local area network (see Figure 1). For the Ion GeneStudio™ S5 Prime Sequencer, we support the layout in which the Ion Torrent™ Server is directly connected to the sequencer (see Figure 2), instead of through the local area network from a remote location such as a server room. Data are most robustly transferred from the Ion GeneStudio™ S5 Prime Sequencer to the Ion Torrent™ Server when they are directly connected by a category 6 Ethernet cable that is provided with the installation materials.

IMPORTANT! The Ion GeneStudio™ S5 Prime Sequencer must be connected to the Ion Torrent™ Server by a category 6 Ethernet cable. We do not troubleshoot data transfer problems that are associated with an indirect connection between the Ion GeneStudio™ S5 Prime Sequencer and the Ion Torrent™ Server.

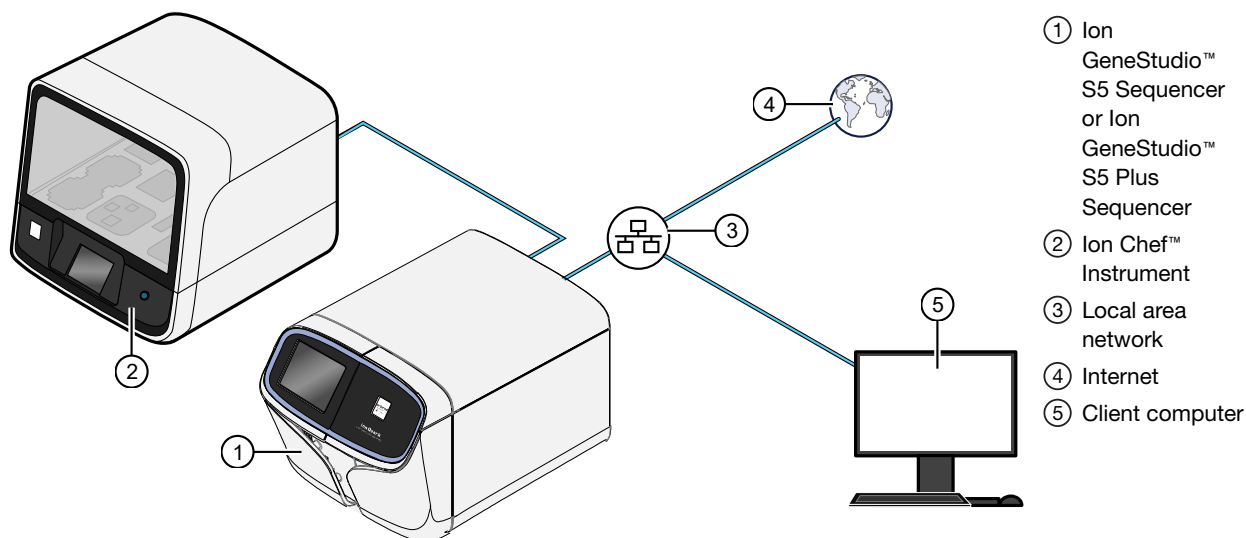


Figure 1 Ion GeneStudio™ S5 Sequencer and Ion GeneStudio™ S5 Plus Sequencer configuration

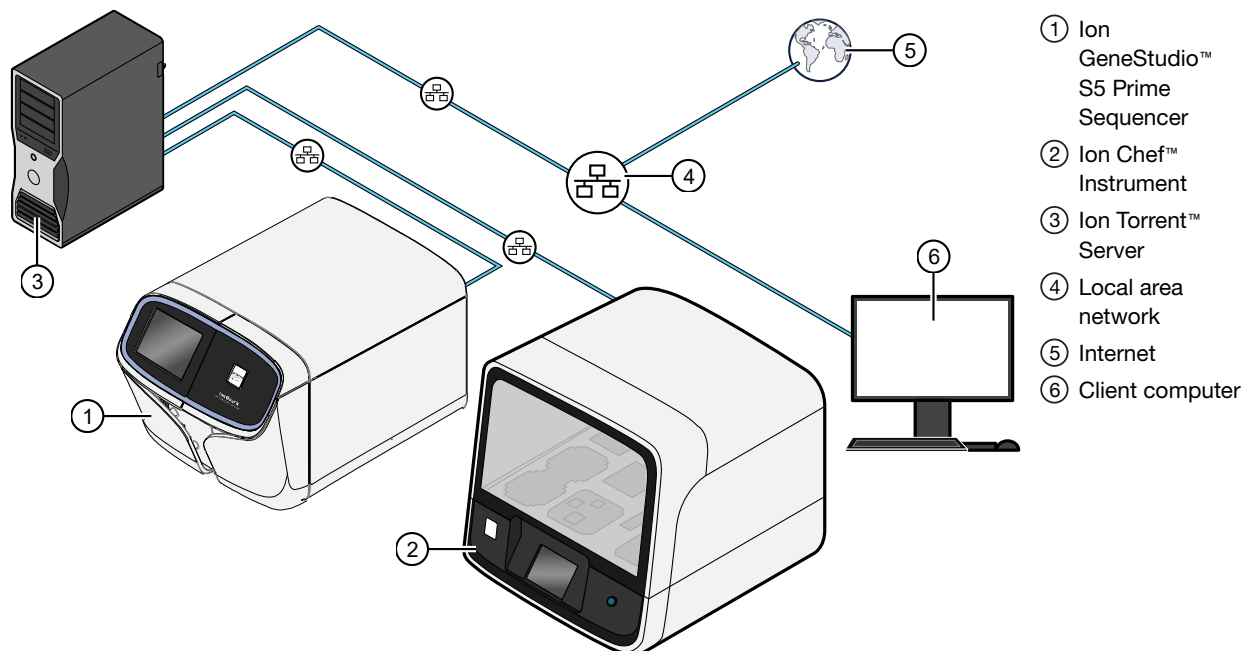


Figure 2 Ion GeneStudio™ S5 Prime Sequencer configuration

Note: In either configuration, the Ion Chef™ Instrument must be connected to the Ion Torrent™ Server either directly using a category 6 Ethernet cable, or indirectly through a local area network that has been configured to allow HTTP-443, SSH-22, and FTP-20/21 traffic. Unlike the Ion GeneStudio™ S5 Prime Sequencer, the Ion Chef™ Instrument does not require a robust network connection to the Ion Torrent™ Server and can accommodate standard network connection speeds.

Planning the installation

In preparation for the Ion GeneStudio™ S5 Sequencer and Ion Chef™ Instrument installation, you must plan the layout of your laboratory to accommodate library and template preparation activities, in addition to those related to chip preparation and sequencing. This section describes the stations involved in the sequencer workflow and the basic laboratory layouts.

Layout of instrument components and equipment

When designing your PCR laboratory layout, follow good laboratory practices to help ensure reliable and contamination-free PCR results. Pay particular attention to the need to separate the areas for pre- and post-PCR activities. Isolating the amplicon source, separating pre-PCR from post-PCR activities, and dedicating laboratory supplies and/or equipment to each space can significantly reduce the potential for contamination.

You can deploy the Ion GeneStudio™ S5 Sequencer and Ion Chef™ Instrument in both one- and two-room laboratory configurations. The two-room layout is highly recommended due to the protection that it affords against contamination; however, the sub-optimal one-room layout will produce acceptable results if proper precautions are observed.

If you choose to deploy the Ion GeneStudio™ S5 Sequencer and Ion Chef™ Instrument in a one-room layout:

- Establish clearly-labeled, separate sets of pipettes for library and template preparation.
- Always move from "clean" to "dirty" (for example, from pre- to post-PCR). We do not recommend moving from "dirty" to "clean" (for example, do not handle post-amplification samples and then make libraries).

Note: The positions of the stations in the pre-and post-PCR rooms are not important.

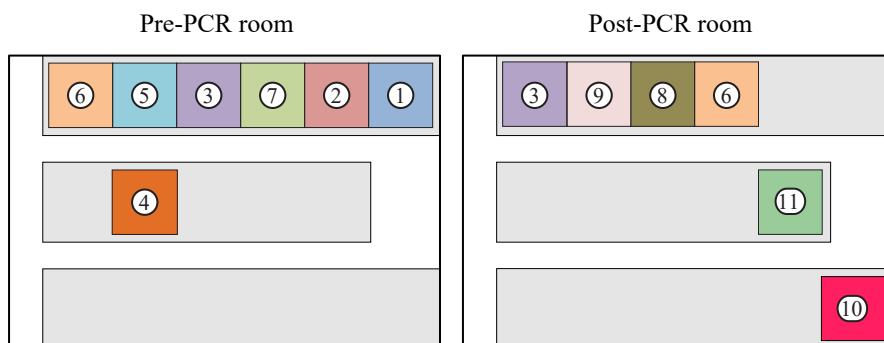


Figure 3 Two-room layout

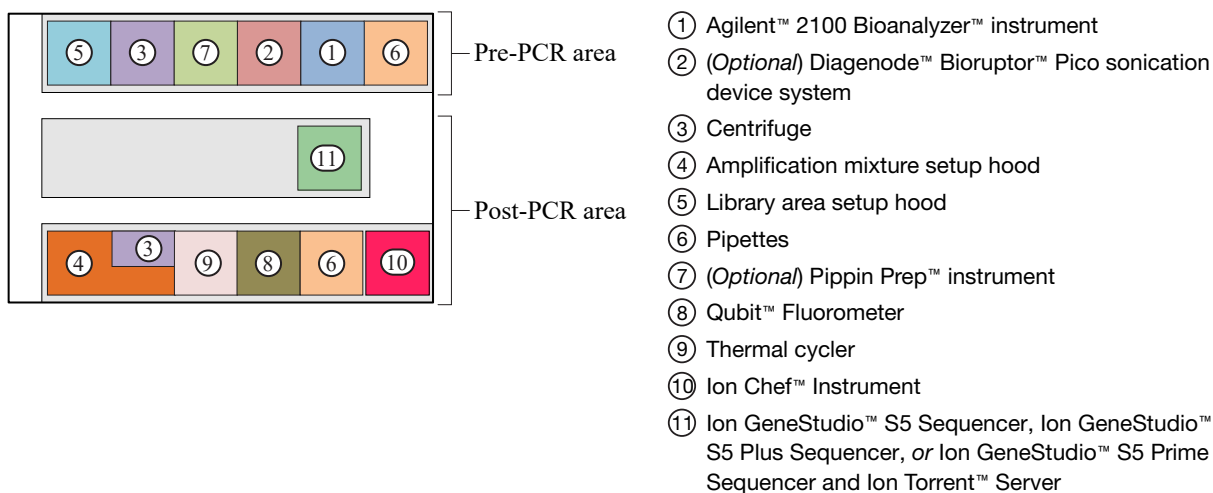


Figure 4 One-room layout

Laboratory workstations

The following table describes workstations that are associated with the generic laboratory layout for the Ion GeneStudio™ S5 Sequencer and Ion Chef™ Instrument. The stations are categorized in terms of their involvement in pre- and post-PCR activities. Note that some stations (pipette and centrifuge) are present in both environments, but the equipment is not necessarily shared between the pre- and post-PCR stations.

#	Station	Location	Description/requirements
1	Agilent™ 2100 Bioanalyzer™ Instrument	Pre-PCR area	Use the Agilent™ 2100 Bioanalyzer™ Instrument to perform library construction quality control, providing yield and size characterization. When planning the instrument placement, consider isolating the Agilent™ 2100 Bioanalyzer™ Instrument from the sequencer, preferably in a room dedicated for library preparation, to minimize contamination. Note: If needed, you can substitute a qPCR instrument for the Agilent™ 2100 Bioanalyzer™ Instrument. In general, qPCR does not yield size distribution but does provide more accurate counts.
2	(Optional) Bioruptor™ System	Pre-PCR area	If required, the Bioruptor™ Instrument performs acoustic shearing/fragmentation of DNA samples for library preparation. You can perform DNA shearing through the use of a Covaris™ Focused-Ultrasonicator or the Ion Express Library Kit, both of which are acceptable substitutes for the Bioruptor™ Instrument. Mechanical shearing is recommended (using Bioruptor™ or Covaris™ instruments), but enzymatic shearing is acceptable and can be less expensive. When planning Bioruptor™ or Covaris™ instrument placement: - Consider placing the instrument in an isolated room to minimize the noise hazard. - Consider isolating the instrument from the sequencer, preferably in a dedicated room for library preparation, to minimize contamination.
3	Centrifuges	Pre- and post-PCR areas	Use centrifuges during library preparation and chip loading, so access is required in both the pre- and post-PCR areas. When planning centrifuge placement: - Consider dedicating separate centrifuges for the pre- and post-PCR operations to minimize contamination. - If only one centrifuge is available, place it in a central location, which is accessible from both areas. - To limit vibrational interference, do not place centrifuges on the same bench as the sequencer instrument. - Most importantly, place the centrifuges in convenient locations.

(continued)

#	Station	Location	Description/requirements
4	Library area setup hood	Pre-PCR area	Whenever possible, perform library preparation in a dedicated hood. The use of a dedicated hood allows for UV treatment of the library preparation area and minimizes contamination from post-PCR material containing adaptors. When selecting a location for library preparation: • In a one-room laboratory layout, we highly recommend the use of a dedicated hood for library preparation, but it is not required. • The library area setup station requires a set of dedicated pipettes. • If a dedicated hood is unavailable, select a bench that is preferably isolated from the neighboring stations.
5	Pipettes	Pre- and post-PCR areas	Both the pre- and post-PCR areas require a complete set of dedicated pipettes. If needed, you can share the pipettes between neighboring stations, except for the amplification mixture and library setup stations, both of which require dedicated sets of pipettes.
6	(Optional) Pippin Prep™ Instrument	Pre-PCR area	If required, use the Pippin Prep™ Instrument to perform automated size selection before template preparation. Use of the Pippin Prep™ Instrument is necessary only if you require size selection for your sample type. Note: You can also do size selection through the use of the E-Gel™ Imager Gel Documentation System, an acceptable substitute for the Pippin Prep™ Instrument.
7	Qubit™ System	Post-PCR area	You can use the Qubit™ 2.0, Qubit™ 3.0, or Qubit™ 4 Fluorometer to perform library quantification or quality control following PCR or just before library preparation.
8	Primer-Annealing Thermal Cycler	Post-PCR area	Use a 96-well thermal cycler to perform the primer-annealing step during template preparation. When selecting a location for the thermal cycler, confirm that the location meets all clearance and environmental requirements for the instrument. Note: If you are using Ion AmpliSeq™ Primers, a pre-PCR thermal cycler is required in the pre-PCR room. Note: A primer-annealing thermal cycler is not required if using the Ion Chef™ System for template preparation.

(continued)

#	Station	Location	Description/requirements
9	Ion Chef™ Instrument	Post-PCR area	When planning the placement of the Ion Chef™ Instrument, confirm that the location meets all clearance and environmental requirements described in this document. Note: If possible, install the Ion GeneStudio™ S5 Sequencer and Ion Chef™ Instrument to a dedicated power outlet.
10	Ion GeneStudio™ S5 Sequencer, Ion GeneStudio™ S5 Plus Sequencer, or Ion GeneStudio™ S5 Prime Sequencer and Ion Torrent™ Server	Post-PCR area	When planning the placement of the Ion GeneStudio™ S5 Prime Sequencer and Ion Torrent™ Server, confirm that the location meets all clearance and environmental requirements described in this document. IMPORTANT! The Ion GeneStudio™ S5 Sequencers are sensitive to electrical noise, vibration, and temperature changes. Note: Because the Ion Torrent™ Server requires a direct connection to the Ion GeneStudio™ S5 Prime Sequencer via a standard Category 6 Ethernet cable, the server is typically installed to the bench directly beneath the instrument.

Environmental requirements

Confirm that the installation room is maintained under correct environmental conditions. Avoid placing the sequencer or server next to heaters, cooling ducts, or in direct sunlight. Place the sequencer at least 1 meter away from major sources of electronic noise such as refrigerators or microwaves. Fluctuations between day and night temperatures can cause system instability.

Component	Acceptable range
Altitude	Located between sea level and 6,500 ft (2,000 m) above sea level
Humidity	Ion GeneStudio™ S5 Sequencer, Ion GeneStudio™ S5 Plus Sequencer, or Ion GeneStudio™ S5 Prime Sequencer : 40-60%, non-condensing Ion Torrent™ Server: 20-80%, non-condensing Ion Chef™ Instrument: 40-60%, non-condensing
Operating Temperature	Ion GeneStudio™ S5 Sequencer, Ion GeneStudio™ S5 Plus Sequencer, or Ion GeneStudio™ S5 Prime Sequencer: 20°C to 30°C (68°F to 86°F) Note: The room temperature must not fluctuate more than 2°C over a 2-hour period. Ion Torrent™ Server: 10°C to 35°C (50°F to 95°F) Ion Chef™ Instrument: 20°C to 25°C (68°F to 77°F)

(continued)

Component	Acceptable range
Vibration	Install the instrument or instruments on benches that have no contact with equipment that causes vibration (freezers, pumps, and similar equipment). Significant vibration during sequencing can add noise and reduce the quality of the sequencing measurements. Note: Where possible we recommend placing the Ion Chef™ Instrument on a separate bench from the Ion GeneStudio™ S5 Sequencer, Ion GeneStudio™ S5 Plus Sequencer, or Ion GeneStudio™ S5 Prime Sequencer, as the Ion Chef™ Instrument can itself cause vibration.
Pollution	The Ion GeneStudio™ S5 Sequencers and Ion Chef™ Instrument are for use in Office or Laboratory controlled environments.
Overvoltage category	The Ion GeneStudio™ S5 Sequencers and Ion Chef™ Instrument have installation (overvoltage) categories of II (2) and are classified as portable equipment.
Other conditions	For indoor use only. Install the Ion GeneStudio™ S5 Sequencers on a level surface. The installation location must be away from any vents that could expel particulate material on the system components.

Thermal specifications for the instrument and server

During operation, the thermal outputs based on the typical current draw of the components are:

Component	Typical draw (W)	Thermal output (BTU/h)
Ion GeneStudio™ S5 Sequencer	520 ^[1]	1,774
Ion GeneStudio™ S5 Plus Sequencer	700 ^[1]	2,388
Ion GeneStudio™ S5 Prime Sequencer	700 ^[1]	2,388
Ion Torrent™ Server ^[2]	1,100	3,753
Ion Chef™ Instrument	990	3,378

^[1] Maximum draw: 1350W

^[2] Minimum Efficiency: 65% (Energy Star Qualified); 85% Efficient Power Supply.

Acoustic specifications for the instrument and server

Component	Audible noise level
Ion GeneStudio™ S5 Sequencer	60 dB at 1 m
Ion Torrent™ Server	≤72 dB at 1 m ^[1]
Ion Chef™ Instrument	<65 dB sound pressure level at 1 m

^[1] Acoustic performance varies based on system configuration and operating conditions.

Ventilation requirements

Allow at least 4 inches (10 cm) of clearance around the Ion GeneStudio™ S5 Sequencer and Ion Chef™ Instrument for ventilation. Do not block air inlets or outlets to allow proper ventilation.

Cleaning or decontamination

See the user documentation for your Ion GeneStudio™ S5 Sequencer and Ion Chef™ Instrument for information on how to clean or decontaminate the instrument.

Wear appropriate protection, including gloves, laboratory goggles, and coat whenever you work with the fluids that are used on this instrument, or parts that may come into contact with these fluids.

Use only the cleaning agents as described in the user documentation for your Ion GeneStudio™ S5 Sequencer and Ion Chef™ Instrument. Use of cleaning agents that are not described in user documentation can impair the instrument. Contact Technical Support if you have questions.

Wipe off any liquid on or near the instrument using a lint-free tissue.

Disposing of waste



WARNING! CHEMICAL HAZARD. Refer to Safety Data Sheets (SDSs) and local regulations for handling and disposing of plastic consumables. Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of plastic consumables.



AVERTISSEMENT ! DANGER CHIMIQUE. Consulter les fiches de données de sécurité (FDS) et les réglementations locales en matière de manipulation et d'élimination des consommables en plastique. Se conformer à la réglementation locale relative à l'élimination des déchets usuels pour réduire l'impact environnemental des consommables en plastique.



WARNING! CHEMICAL HAZARD. Before handling chemicals, refer to the Safety Data Sheet (SDS) provided by the manufacturer, and observe all relevant precautions.



AVERTISSEMENT ! DANGER CHIMIQUE. Avant de manipuler des produits chimiques, se référer à la fiche de données de sécurité (FDS) fournie par le fabricant et respecter toutes les précautions d'usage.



WARNING! CHEMICAL HAZARD. All chemicals in the instrument, including liquid in the lines, are potentially hazardous. Always determine what chemicals have been used in the instrument before changing reagents or instrument components. Wear appropriate eyewear, protective clothing, and gloves when working on the instrument.



AVERTISSEMENT ! DANGER CHIMIQUE. Tous les produits chimiques contenus dans l'instrument, notamment le liquide dans les lignes, sont potentiellement dangereux. Toujours déterminer les produits chimiques utilisés dans l'instrument avant le remplacement de réactifs ou de composants de l'instrument. Porter des gants, des vêtements de protection et des protections oculaires appropriés lors de toute intervention sur l'instrument.



WARNING! CHEMICAL HAZARD. Waste produced by instruments can be hazardous and can cause injury or illness.



AVERTISSEMENT ! DANGER CHIMIQUE Les déchets produits par les instruments peuvent être dangereux et entraîner des blessures ou des maladies.

Electrical requirements



WARNING! For safety, the power outlet used for powering the instrument must be accessible at all times. See “Instrument clearances” on page 7 for information about the space needed between the wall and the instrument. In case of emergency, you must be able to immediately disconnect the main power supply to all the equipment. Allow adequate space between the wall and the equipment so that the power cords can be disconnected in case of emergency.



AVERTISSEMENT ! Par souci de sécurité, la prise de courant alimentant l'instrument doit être accessible à tout moment. En cas d'urgence, il doit être possible de débrancher immédiatement l'alimentation principale de l'ensemble des équipements. Laisser suffisamment d'espace entre le mur et les équipements afin de pouvoir débrancher les câbles d'alimentation sans encombre, en cas d'urgence.

- Electric receptacle required: 2-prong with ground pin
- Mains AC line voltage tolerances must be up to $\pm 10\%$ of nominal voltage

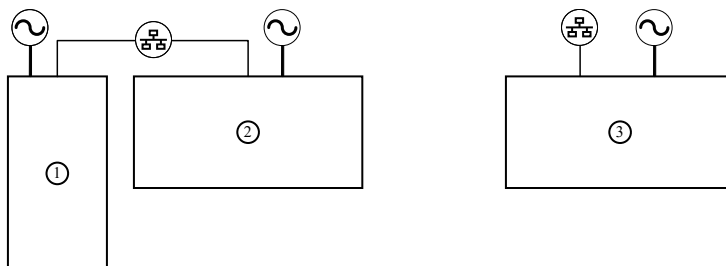
Component	Input voltage (VAC)	Frequency (Hz)	Rated Current (A) ^[1]
Ion GeneStudio™ S5 Sequencer	100-240	50/60	14.0
Ion GeneStudio™ S5 Plus Sequencer	100-240	50/60	14.0
Ion GeneStudio™ S5 Prime Sequencer	100-240	50/60	14.0
Ion Torrent™ Server ^[2]	90-265	50/60	12
Ion Chef™ Instrument	100-240	50/60	12

^[1] Based on rated current at minimum input voltage.

^[2] Minimum Efficiency: 65% (Energy Star Qualified); 85% Efficient Power Supply.

Electrical requirements for the Ion GeneStudio™ S5 System and Ion Torrent™ Server

Use an approved UL Listed detachable power supply cord to connect the sequencer to the wall. Route power cords away from the workspace to avoid accidental disconnection.



- ① Ion Torrent™ Server
- ② Ion GeneStudio™ S5 Sequencer
- ③ Ion GeneStudio™ S5/Ion GeneStudio™ S5 Plus Sequencer

Power cords are provided with the instrument. If not suitable for installation in your region, ensure that any power cord you do use is:

- Maximum 10 ft (3 m) in length
- Grounding type
- Compatible with the power supply receptacles used to connect to main power
- Suitable for the rating of the instrument and mains power supply
- Compliant with local safety requirements (for example, UL Listed for North America, JIS approved for Japan, HAR or agency certified for Europe)

Electrical protective devices

We recommend several protective devices to protect the system in environments with large voltage and power fluctuations.

Device	Description
Power line regulator	We recommend the use of a 1.5-kVA power line regulator in areas where the supplied power fluctuates in excess of $\pm 10\%$ of the normal voltage. Power fluctuations can adversely affect the function of the instrument and computer. Note: A power line regulator monitors the input current and adjusts the power supplied to the instrument or computer. It does not protect against a power surge or failure.

(continued)

Device	Description
Uninterruptible power supply (UPS)	IMPORTANT! UPSs provide power for a limited time (minutes, not hours). They are meant to delay the effects of a power outage, not to serve as replacement power sources. In the event of a power loss, power off the instrument and computer unless you expect to regain power within the battery life of the UPS. We recommend the use of at least 1.5-kVA dual-conversion uninterruptible power supply (UPS) with a power rating of 1800W or higher, especially in areas prone to power failure. Additional battery pack capacity may be required depending on how much hold up time is required. Other factors may also affect hold up time including but not limited to, high temperature, frequent discharges, and battery age. Regular preventative maintenance of the UPS system and battery pack(s) is recommended. Power failures and other events that abruptly terminate the function of the instrument and computer can corrupt data and possibly damage the system. IMPORTANT! Each system, the Ion Chef™ System, the Ion GeneStudio™ S5 System, and the Ion Torrent™ Server (when present), should be connected to its own UPS device. The UPS should not be shared among instruments. Additionally, if an Ion Reporter™ Server is included, it should also be connected to its own 1.5-kVA dual-conversion uninterruptible power supply (UPS) with a power rating of 1800W or higher.  WARNING! PHYSICAL INJURY HAZARD. Do not attempt to lift the UPS unit without assistance of at least two people. Improper lifting can cause painful and permanent back injury. Refer to the UPS manufacturer user guide for more information.  AVERTISSEMENT ! RISQUE DE BLESSURES CORPORELLES. Ne pas essayer de soulever l'onduleur sans l'aide d'au moins deux personnes. En soulevant incorrectement l'appareil, l'opérateur risque de se blesser au dos de façon permanente. Voir le guide de l'utilisateur du fabricant de l'onduleur pour plus d'informations.
Surge protector	We recommend the use of a 10-kVA surge protector (line conditioner) in areas with frequent electrical storms or near devices that are electrically noisy, such as refrigerators, air conditioners, or centrifuges. Short-duration, high-voltage power fluctuations can abruptly terminate the function of, and thereby damage the components of, the computer and the instrument. Note: A dedicated line and ground between the instrument, computer, and the building's main electrical service can also prevent problems caused by power fluctuations.

Network requirements

The Ion GeneStudio™ S5 Sequencer, Ion Chef™ Instrument, and Ion Torrent™ Server require network connectivity for instrument communication, software updates, and remote support. Review the following information before installation.

Network and password security recommendations

To support secure operation of Torrent Suite™ Software, the following measures are recommended during installation and setup.

- Update default credentials
 - Immediately update all default login credentials for the software during setup.
 - Replace any preset or shared passwords with strong, unique passwords known only to authorized users.
 - For systems with multiple software installations, use different credentials for each installation.
- Verify network configuration
 - Confirm that the network configuration follows the recommendations in this site preparation guide.
- Limit external network exposure
 - Operate the software and connected devices in a secure laboratory network.
 - Do not connect the system directly to the public Internet. Protect the system with a firewall or a secure VLAN.

For questions about the network configuration or security settings of your laboratory or facility, contact your facility administrator, IT, or security personnel.

Note: System security is continuously monitored and improved, and software updates are provided as they become available.

Physical network requirements

The Ion Torrent™ Server is factory-configured for the TCP/IP protocol. The product includes a fast Ethernet adapter (10/100 Mbps) with an RJ45-type connector and one 3-m (9.8-ft) crossover Ethernet cable that connects the computer and the instrument. If the Ion Torrent™ Server will be more than 10 feet from the instrument, you must provide a standard Category 6 Ethernet cable of sufficient length to connect the server to your LAN.

Note: The supported configuration of the Ion GeneStudio™ S5 Prime Sequencer is a direct connection between the instrument and the server.

If the system will be connected to a local area network (LAN), an active, tested LAN connection must be available before the scheduled installation date.

If the Ion GeneStudio™ S5 System will be installed without a connection to a LAN, provide a router to access data generated by the instrument. Connection and configuration of the router is not the responsibility of the field service engineer.

The following requirements must be met before installation:

- An information technology resource must be available to assist with the network connection on the installation date.
- The room where the Ion Torrent™ Server will be installed must contain at least one active network jack.

Discuss any discrepancies with your field service representative before the installation visit.

Network configuration

The following network configuration requirements must be met before installation.

- Reserve a static or dynamic IP address for the Ion GeneStudio™ S5 Plus Sequencer or Ion Torrent™ Server.

Note: If needed, field service can provide the MAC address of the Ion GeneStudio™ S5 Plus Sequencer or Ion Torrent™ Server before installation.

- If Dynamic Host Configuration Protocol (DHCP) is unavailable or will not be used, reserve a static IP address for the Ion Chef™ System.
- Configure the site Domain Name System (DNS) server so that users can access the Ion Torrent™ Server URL from their workstations.

Configure the site DNS server so that the Ion Chef™ Instrument can resolve the URL of the associated Ion Torrent™ Server.

- Connect the Ion Chef™ Instrument to the associated Ion Torrent™ Server either directly using a Category 6 Ethernet cable or indirectly through a LAN.
- If the Ion Chef™ Instrument is connected through a LAN, configure the LAN to allow HTTPS (443), SSH (22), and FTP (20/21) traffic between the Ion Chef™ Instrument and the associated Ion Torrent™ Server.
- The Ion Chef™ Instrument can communicate with only one Ion Torrent™ Server at a time. To access multiple Ion Torrent™ Servers on the same LAN, enable Planned Run sharing.
- To use Planned Run sharing and FTP functionality, all Ion Chef™ Instruments and associated Ion Torrent™ Servers must be on the same subnet.

For information about enabling Planned Run sharing, see the *Ion Chef™ Instrument Network Connection User Guide* (Pub. No. [MAN0013444](#)).

Internet access and remote support

The Ion GeneStudio™ S5 Sequencer, Ion GeneStudio™ S5 Plus Sequencer, Ion Chef™ Instrument and Ion Torrent™ Server (in an Ion GeneStudio™ S5 Prime System) should be connected to a network with Internet access. Connecting to the Internet enables you to update the software and access remote system support.

The Ion GeneStudio™ S5 Sequencer, Ion GeneStudio™ S5 Plus Sequencer, and Ion Torrent™ Server require outbound Internet access through HTTP (80) to the following sites to obtain software updates:

- <http://ionupdates.com>
- <http://us.archive.ubuntu.com>

The Ion GeneStudio™ S5 Sequencer, Ion GeneStudio™ S5 Plus Sequencer, and Ion Torrent™ Server require an efficient Internet connection to download software updates. If Internet access is unavailable, software updates must be installed manually using a USB device.

IMPORTANT! Thermo Fisher Scientific does not support manual software updates. If you choose to download updates to a USB device and manually update the Ion Torrent™ Server, you do so at your own risk. Any issues resulting from this update method that require Thermo Fisher Scientific intervention are not covered by the warranty or any service contract that you have purchased. You must schedule an on-site visit by a field service engineer at your own expense.

The Ion GeneStudio™ S5 Sequencer, Ion GeneStudio™ S5 Plus Sequencer, Ion Chef™ Instrument, and Ion Torrent™ Server include remote monitoring capabilities that help you maintain your system and enable Thermo Fisher Scientific to provide timely technical support. These capabilities use the Axeda Remote System Monitoring (RSM) Agent and require outbound Internet access through HTTPS (443) and SSH (22).

IMPORTANT! Without outbound access through HTTPS (443) and SSH (22), Thermo Fisher Scientific may be unable to provide remote support and cannot guarantee timely resolution of service issues.

The Ion GeneStudio™ S5 Plus Sequencer and Ion Torrent™ Server must be protected behind an appropriately configured network firewall.

Required outbound Internet access ports

Component	Required outbound ports
Ion Chef™ Instrument	HTTPS (443), SSH (22)
- Ion GeneStudio™ S5 Sequencer - Ion GeneStudio™ S5 Plus Sequencer - Ion Torrent™ Server	HTTP (80), HTTPS (443), SSH (22)

At minimum, allow outbound access to the following addresses:

- `drm.appliedbiosystems.com` using HTTPS (443)
- `rssh.iontorrent.net` using SSH (22)

If the Ion Chef™ Instrument uses Network Time Protocol (NTP) for date and time synchronization, allow outbound access through UDP port 123 to the NTP server pool at `pool.ntp.org`.

Although not recommended, you can enable access to the Ion Torrent™ Server from the internet (via the web server running on the Ion Torrent™ Server). If you provide such access, restrict access to the server using HTTP firewall rules, authentication firewall rules, or a combination of both. Implementing and maintaining these restrictions is the responsibility of the server administrator and not Thermo Fisher Scientific.

For more information about service remote monitoring features, see the [Remote Monitoring and Diagnostics Service FAQs](#).

Data backup and data storage

You must have an established setup for regularly backing up and archiving your data. Data backup is solely your responsibility. In the event your system needs repair, Thermo Fisher Scientific is not responsible for data backup or any loss of data.

Note: A paid data migration service is available if needed. Contact your Thermo Fisher Scientific representative for more information.

For more information about data storage compatibility, contact your local support team.

Safety requirements

Safety practices

A safety representative from your facility must ensure that:

- Personnel establish and follow all applicable safety practices and policies to protect laboratory personnel from potential hazards.
- All applicable safety devices and equipment are available at all times.

Required safety equipment

Your laboratory has specific safety practices and policies designed to protect laboratory personnel from potential hazards that are present. Follow all applicable safety-related procedures at all times.

The following safety equipment and protection from hazards must be available at the installation site:

- Protection from any sources of hazardous chemicals, radiation (for example, lasers, radioisotopes, radioactive wastes, and contaminated equipment), and potentially infectious biological material that may be present in the area where the service representative will work.
- Eyewash
- Safety shower
- Eye and hand protection
- Adequate ventilation, including vent line/fume hood, if applicable
- Biohazard waste container, if applicable
- First-aid equipment
- Spill cleanup equipment
- Applicable Safety Data Sheets (SDSs)

Materials for installation and operation

Installation checklist

See the *Ion GeneStudio™ S5 Systems Pre-Installation Checklist* (Pub No. MAN0013777) for the materials required to install Ion GeneStudio™ S5 systems. The checklist identifies the materials that must be available onsite before installation and training.

Installation kit

The Ion S5™ Installation Kit (Cat. No. A27215) is available to first-time owners of an Ion GeneStudio™ S5 System and is shipped with the instrument. The kit contains the core reagents and controls that are used during the installation, training, and operation of the instruments.

Ion S5™ Installation Kit (Part No. A27215; Not available for separate order.)

Item	Part No.	Amount	Storage
Ion 540™ Chip Kit	A27765	4 pack	15°C to 30°C
Ion S5™ Sequencing Solutions	A27767	1	
Ion S5™ Sequencing Reagents	A27768	1	–30°C to –10°C
Ion S5™ Cartridge Tool	A28308	1	15°C to 30°C

The following table lists the materials required for installation of the Ion Chef™ Instrument.

Ion Chef™ Instrument installation materials

Item ^[1]	Description	Part No. ^[2]	Amount
Ion Chef™ Install Supplies	The Ion Chef™ Install Supplies are shipped with the instrument. No separate order is required.	4488374	1
Uninterruptible power supply (UPS)	We recommend using a UPS in laboratories that experience frequent power outages or line voltage fluctuations. The UPS must support a minimum output of 1500 W. A 1500 VA unit from APC provides approximately 11 minutes of backup power for a single instrument.	MLS	1
Isopropyl alcohol (IPA) wipes	Use IPA wipes during instrument installation and maintenance procedures.	MLS	Varies

^[1] This protocol was verified using the specified material. Substituting another material can adversely affect system performance.

^[2] "MLS" indicates that the material is available from [fisherscientific.com](https://www.fisherscientific.com) or another major laboratory supplier.

Operation materials

Additional supplies and consumables are necessary for routine operation. Contact a sales representative to order these additional supplies. Use only supplies as specified by Thermo Fisher Scientific.

Materials for template and library preparation

For more information about Ion Torrent™ sequencing applications and materials and equipment required for library and template preparation, see the documentation at [thermofisher.com](https://www.thermofisher.com).

Receive and inspect the shipment

1. Verify that the items shown on the shipping list are the items that were ordered at the time of purchase.
2. Carefully inspect the shipping containers. Take photographs of any damage, then report the damage to the shipping company and to your service representative. Record any damage or mishandling on the shipping documents.
3. Immediately unpack the reagents or installation kit box (boxed separately from the instrument components). Store the reagents at the temperatures specified on the product packaging or labels. Storage temperatures are also listed in “Installation kit” on page 24.

IMPORTANT! Other than reagents or plates that require storage at specific conditions, do not unpack the instrument shipping containers at this time. To protect yourself from liability for damage that occurred during shipping, inspect the shipping containers and report damage as described above.

Move the crated instrument to the installation site

1. Clear the installation site of all unnecessary materials.
2. If possible, move the crated instrument and other shipping containers to the installation site. Do not uncrate.



CAUTION! PHYSICAL INJURY HAZARD. Do not attempt to lift or move the instrument without the assistance of others, the use of appropriate moving equipment, and proper lifting techniques. Improper lifting can cause painful and permanent back injury. Depending on the weight, moving or lifting an instrument may require two or more people.

IMPORTANT! Do not tip the crated instrument on end. Tipping may damage the instrument hardware and electronics.

Note: After installation, retain the crate and instrument packaging in case you need to relocate the instrument.

Documentation and support

Related documentation

Document	Pub. No.
<i>Ion S5™ Sequencer User Guide</i>	MAN0017528
<i>Ion GeneStudio™ S5 Systems Pre-Installation Checklist</i>	MAN0013777
<i>Ion Chef™ Instrument User Guide</i>	MAN0018668
<i>Ion Chef™ System Pre-Installation Checklist</i>	MAN0009817
<i>Ion Chef™ Instrument Network Connection User Guide</i>	MAN0013444

Customer and technical support

Visit thermofisher.com/support for the latest service and support information.

- Worldwide contact telephone numbers
- Product support information
 - Product FAQs
 - Software, patches, and updates
 - Training for many applications and instruments
- Order and web support
- Product documentation
 - User guides, manuals, and protocols
 - Certificates of Analysis
 - Safety Data Sheets (SDSs; also known as MSDSs)

Note: For SDSs for reagents and chemicals from other manufacturers, contact the manufacturer.

Limited product warranty

Life Technologies Corporation and its affiliates warrant their products as set forth in the Life Technologies' General Terms and Conditions of Sale at www.thermofisher.com/us/en/home/global/terms-and-conditions.html. If you have questions, contact Life Technologies at www.thermofisher.com/support.



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For descriptions of symbols on product labels or product documents, go to thermofisher.com/symbols-definition.

Revision history: MAN0017529 F (English)

Revision	Date	Description
F	23 June 2026	- Information that is needed to prepare sites for installation of an Ion Chef™ System was added. - Network and password security recommendations were added ("Network and password security recommendations" on page 20). - The weight and dimensions for the Ion Torrent™ Server were updated ("Components" on page 6). - References to the Ion OneTouch™ 2 Instrument and Ion OneTouch™ ES Instrument were removed. - An acoustics specifications table was added for the instrument and server ("Acoustic specifications for the instrument and server" on page 14). - The network and remote monitoring information was updated ("Network configuration" on page 21). - The Ion Chef™ Instrument clearance and environmental requirement information was updated ("Instrument clearances" on page 7 and "Environmental requirements" on page 13). - Minor updates were made for consistency of style and terminology.
E	15 September 2025	Updated UPS specifications.
D	28 August 2025	Updated UPS specifications and data storage recommendations.
C.0	1 February 2023	Removed the following skus from the Ion S5™ Installation Kit contents table. - A28195 - A27897 - A29022
B.0	21 February 2022	Update the quantity of the Ion S5™ Cartridge Tool in the Ion S5™ Installation Kit. Update site preparation workflow to current format.
A.0	5 January 2018	New site preparation guide for Ion GeneStudio™ S5 Series sequencers.

The information in this guide is subject to change without notice.

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