TFinity Plus Library

Site Preparation Guide

SpectraLogic.com

Part Number

90940047 Revision J

Revision History

Revision	Date	Description
A	November 2009	Initial release.
B	June 2010	Updated regulatory information added LTO-5
C	January 2013	Updated for corrections and added bulk TAP.
D	March 2015	Updated trademarks.
E	February 2019	Updated for new drive types.
F	November 2020	Updated for non-isolating service bay configuration.
G	March 2021	Updated for Dual AC2 input testing, corrected frames widths, caster and leveling feet location.
H	June 2021	Updated with expanded non-isolating service frame information and LTO-9.
I	April 2023	Updated with minor corrections.
J	May 2025	Updated for LTO-10.

Notes:

- To make sure you have the most current version of this guide check the Spectra Logic Technical Support portal at: support.spectralogic.com/documentation/user-guides/.
- To make sure you have the release notes for the most current version of the LumOS software, check the Spectra Logic Technical Support portal at: support.spectralogic.com/documentation/release-notes/.

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Warnings

A document listing all warnings found in Spectra Tape Libraries documentation, in English and 27 other languages, is available on the Spectra Logic website at support.spectralogic.com/documentation.

WARNING

Library frames are very heavy (see product specifications for details). Use extreme caution and proper equipment when moving these, and ensure that your floor has adequate structural integrity.

WARNING

Line voltage exists at these connectors.

Only qualified personnel should attempt to conduct this test.

Use extreme caution when taking measurements.

WARNING

Boxed and unboxed library components weigh from 200 to 400 pounds each (91 to 181 kg) or more. Use extreme caution and proper equipment when moving these.

WARNING

The ties around the shipping crates are secured very tightly; the tension may cause them to whip outward when cut. Use care when cutting the ties so that you will not be hit.

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Contents

About This Guide

This guide describes site preparation requirements and guidelines for the installation of a Spectra® TFinity library. It includes precautions for safety and handling, as well as facility requirements for the library's environment, cabling, and placement. This guide also provides a checklist that you can use to help ensure that your site is prepared before your library arrives.

Intended Audience

This guide is intended for data center administrators preparing a site for a TFinity library installation. It provides reference information for facility managers, electricians, IT professionals and other specialists who will have roles in preparing the site.

Related Information

The following sections contain information about additional TFinity-related documentation that is available.

Spectra TFinity Plus Library

This guide and the following documents related to the Spectra TFinity are available as PDF files on the Spectra Logic website at: support.spectralogic.com/documentation.

- The *Spectra TFinity Library User Guide* describes how to configure, use, maintain, and troubleshoot the Spectra TFinity library. It also provides specifications for the library.
- The *Spectra BlueScale Vision Camera User Guide* provides detailed information about installing and using the white BlueScale Vision Camera and software.
- The *Vivotek FD8361 Fixed Dome Network Camera User's Manual* provides detailed information about installing and using the black BlueScale Vision Camera and software.
- The *Spectra Tape Libraries SCSI Developer's Guide* provides detailed information about the SCSI and Fibre Channel commands used in the library.
- The *Spectra Tape Libraries Warnings* document provides all of the warnings found in Spectra tape libraries documentation, in English and 27 other languages.

The following document is available after logging into your Support portal account at: support.spectralogic.com.

- The *Spectra TFinity Plus Library Release Notes and Documentation Updates* provides the most up-to-date information about the TFinity, drives, and media.

LTO Ultrium Tape Drives

The following documents provide information that is applicable to all IBM LTO tape drives.

- *IBM Tape Device Drivers Installation and User's Guide*

  Note: This guide also provides information about using the IBM Tape Diagnostic Tool (ITDT) to troubleshoot drive problems.

- *IBM TotalStorage LTO Ultrium Tape Drive: SCSI Reference* (LTO-1 through LTO-4)
- *IBM TotalStorage LTO Ultrium Tape Drive: SCSI Reference* (LTO-5 and later)

For drive-specific information, search for the product name (for example, LTO 5) on the documentation page on the IBM website. You can also search the IBM Support Portal at: https://ibm.com/support/knowledgecenter/.

TS11*xx* Technology Drives

The following documents provide information that is applicable to TS11*xx* technology drives.

- *IBM System Storage Tape Drive 3592 SCSI Reference*
- *IBM Tape Device Drivers Installation and User's Guide*

Note: This guide also provides information about using the IBM Tape Diagnostic Tool (ITDT) to troubleshoot drive problems.

StorageTek T10000 Drives

The following documents provide information that is applicable to StorageTek T10000 drives, which are referred to as *T10K* drives in this book.

- *StorageTek T10000 Tape Drive Operator's Guide*

Spectra SKLM Server

For additional information that can assist you during the installation and configuration of your server, see the following website:

- *IBM Security Key Lifecycle Manager welcome page*

KMIP

See the documentation specific to your server.

Typographical Conventions

This document uses the following conventions to highlight important information:

WARNING Read text marked by the "Warning" icon for information you must know to avoid personal injury.

Caution Read text marked by the "Caution" icon for information you must know to avoid damaging the library, the tape drives, or losing data.

Important Read text marked by the "Important" icon for information that helps you complete a procedure or avoid extra steps.

Note: Read text marked with "Note" for additional information or suggestions about the current topic.

CHAPTER 1

Library Overview

The Spectra TFinity enterprise-class library is designed and built to meet the stringent requirements for data integrity, data security and high reliability in the enterprise environment. The following sections provide an overview of the library components. Depending on the options you ordered, some of the components shown may not be included in your library. For detailed descriptions of the library components and media, read the Library Overview chapter in the *Spectra TFinity Library User Guide*.

Note: The library will be installed by a certified Spectra Logic field engineer. The information in the following sections is provided for your reference only. This document is not an installation guide.

FRONT PANEL COMPONENTS

Figure 1 shows the front components of the library. It also shows the relative locations of the main frame, the expansion frames, and the service frames.

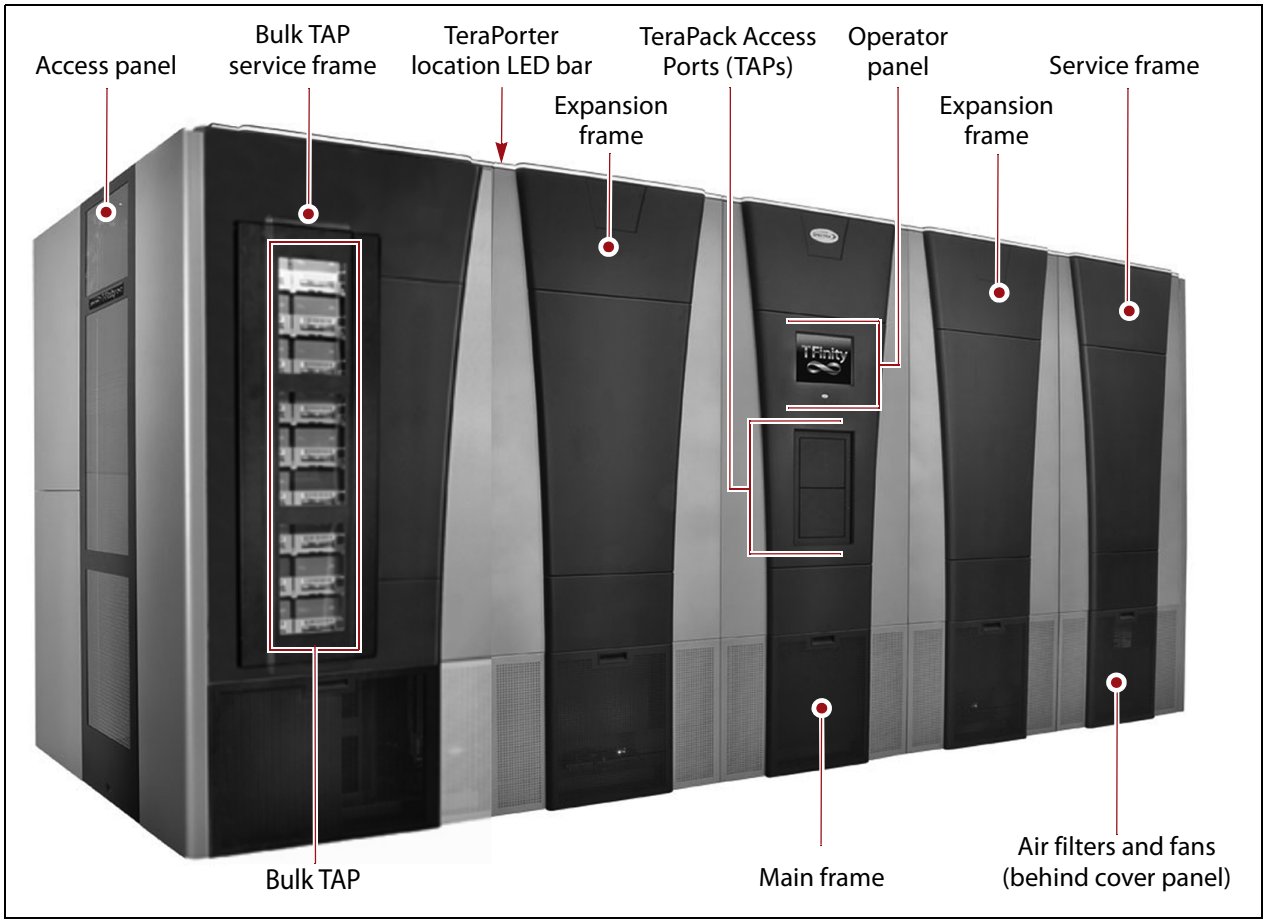


Figure 1 Front panel components.

Main and Drive Expansion Frame Rear Components

Figure 2 shows the rear panel components of the library's main frame. With few exceptions, the same components are also present in each drive expansion frame.

Note: Any bays that do not contain components have covers installed to ensure proper air circulation through the library.

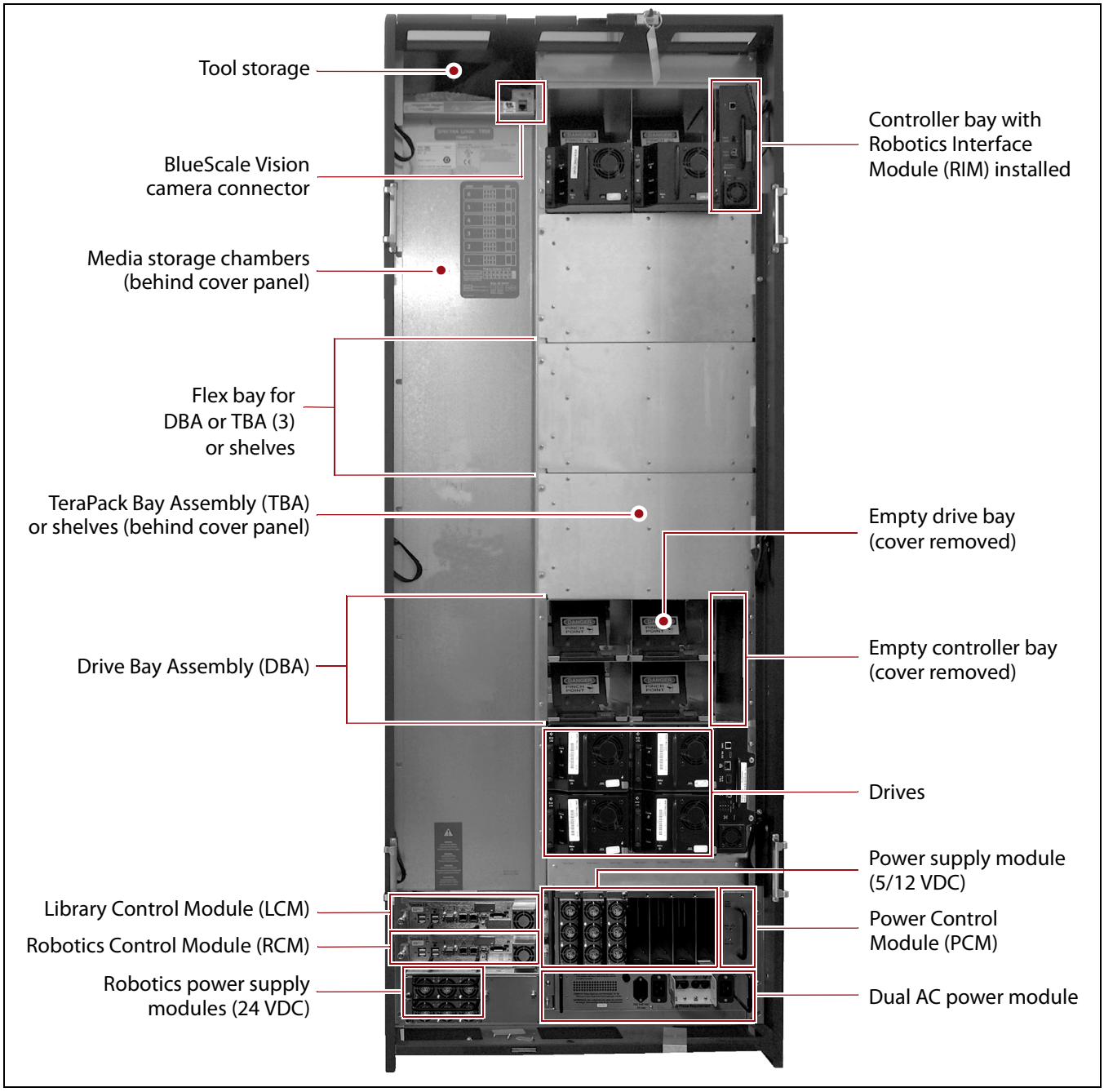


Figure 2 Library main frame rear components (doors removed).

SERVICE FRAME

The standard TFinity library includes two service frames, one for each TeraPorter in a standard two TeraPorter library. The service frame is the last frame on each end of the library.

Note: A non-isolating service frame configuration is available that replaces the right and left service frame with media expansion frames (see Media Expansion Frames). This provides more storage slots at a lower cost, but means that some slots may be inaccessible if the library has two TeraPorters and one of the TeraPorters is in the service position. The chambers that could be blocked by the TeraPorter are called the exclusion zone. They are the last chambers filled when importing magazines. For maximum availability, Spectra Logic recommends not licensing/using the chambers in the exclusion zone. In an LTO library, each non-isolating service frame has 78 chambers that are always accessible by both robots and 52 chambers in the exclusion zone. In a TS11*xx* technology library, each non-isolating service frame has 66 chambers that are always accessible by both robots and 44 chambers in the exclusion zone.

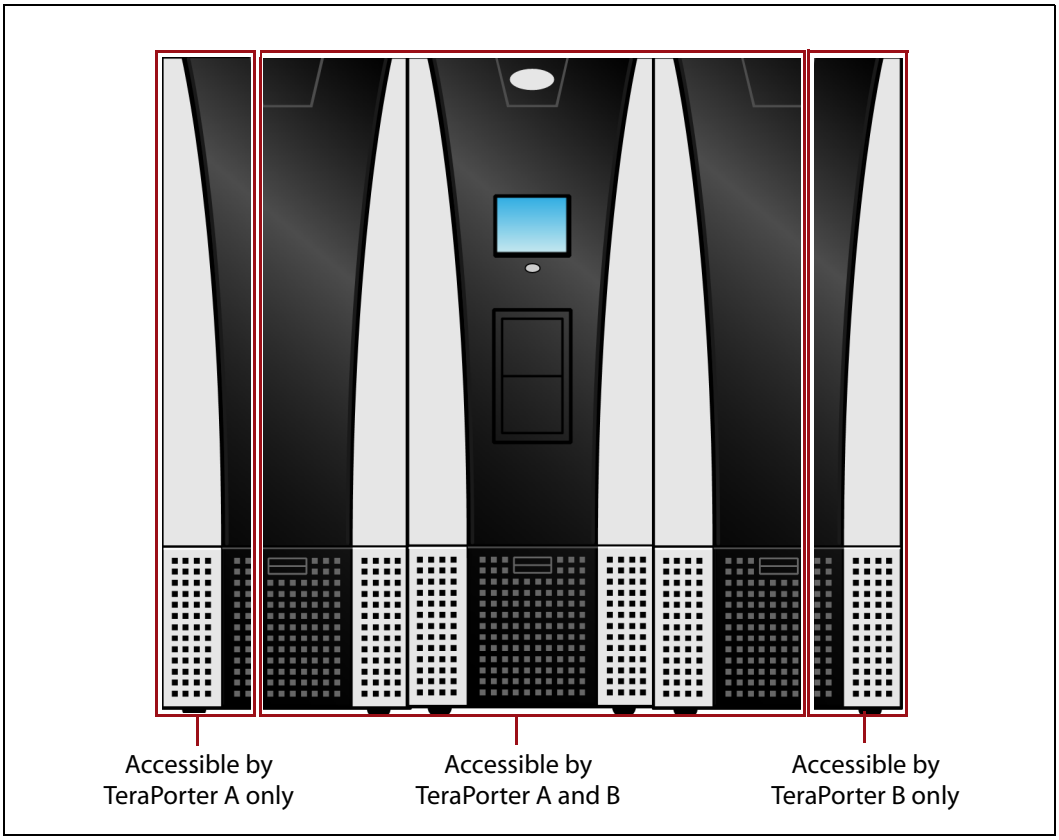


Figure 3 A dual-robot, non-isolating service frame example.

Rear Panel Components

The library includes two service frames, one for each TeraPorter. The service frame is the last frame on each end of the library.

Figure 4 shows the components of the service frame.

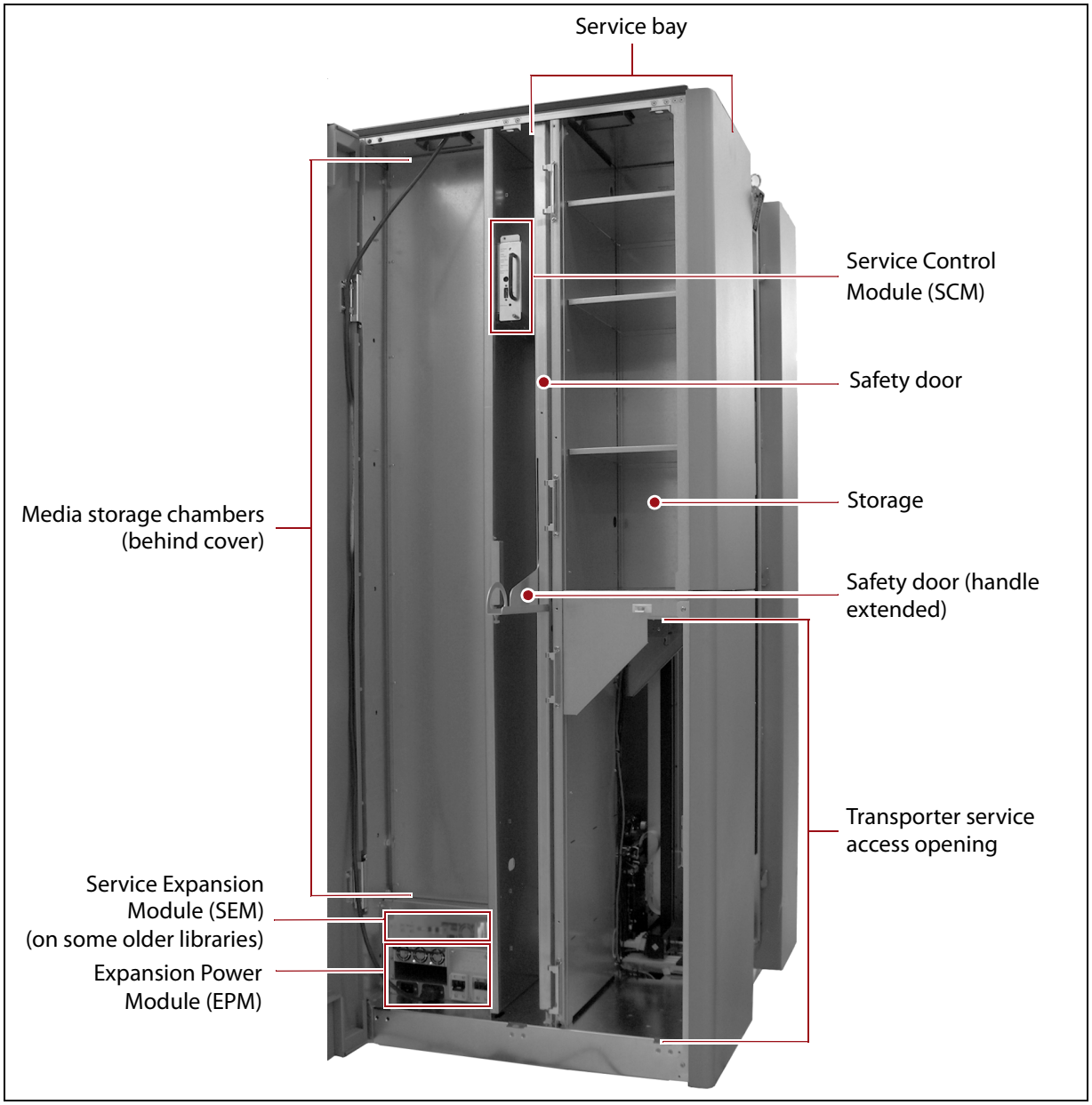


Figure 4 Service frame components (back-side of left-hand service frame shown).

Bulk TAP Service Frame Front Panel Components

The bulk TeraPack Access Port (bulk TAP) service frame can replace the left or right service frame. It includes the components of the standard service frame (see Service Frame on page 18) and a bulk TAP carousel used to import or export up to 14 magazines in a single operation.

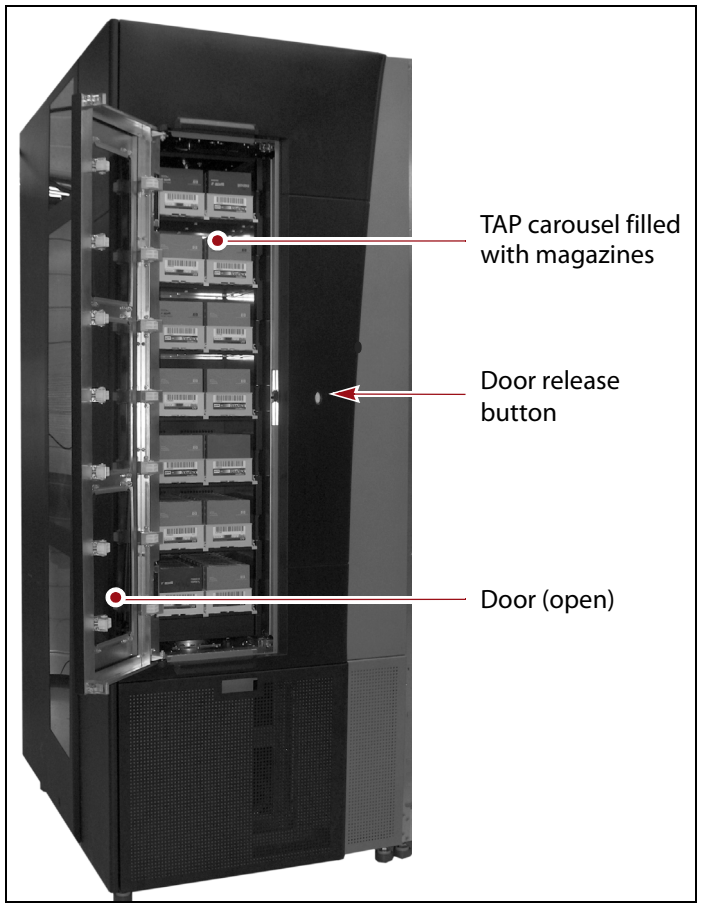


Figure 5 The front of the bulk TAP media frame.

Media Expansion Frames

Media expansion frames are for media storage only and do not include any active front or rear panel components.

Library Capacity

The TFinity library's modular design makes it possible to increase media capacity or the number of drives in the library to meet storage and performance needs as they evolve. The minimum configuration TFinity consists of three frames: the main frame and two service frames. A mix of media and drive expansion frames can be added for a maximum total of 44 frames. The frames are positioned to provide the most efficient configuration based on the site requirements. The service frames or bulk TAP service frames are always located at the outside ends of the library.

The following table shows the number of media storage chambers and drives in each type of frame in the TFinity.

Frame Type	Description	Number of Chambers for LTO Frame [a]	Number of Chambers for TS11xx technology, T10K, or Mixed Media Frame [b]	Number of Drives
Main [c]	Contains: ▪ the operator panel ▪ the center TAP assembly with two chambers ▪ the LCM ▪ an RCM ▪ RIMs ▪ An EtherLib switch (optional) ▪ power supplies ▪ drives in either three or six DBAs ▪ chambers for magazine storage	▪ 92 chambers with 3 DBAs and 3 TBAs —OR— ▪ 80 chambers with 6 DBAs	▪ 78 chambers with 3 DBAs and 3 shelves installed —OR— ▪ 66 chambers with 6 DBAs	▪ From 1 to 12 drives with 3 DBAs —OR— ▪ From 1 to 24 drives with 6 DBAs
Drive expansion	Contains: ▪ an RCM ▪ RIMs ▪ power supplies ▪ drives in either three or six DBAs ▪ chambers for magazine storage	▪ 101 chambers with 3 DBAs and 3 TBAs —OR— ▪ 89 chambers with 6 DBAs	▪ 87 chambers with 3 DBAs and 3 shelves installed —OR— ▪ 75 chambers with 6 DBAs	▪ From 1 to 12 drives with 3 DBAs —OR— ▪ From 1 to 24 drives with 6 DBAs
Media expansion [d]	Contains: ▪ chambers for magazine storage	▪ 130 chambers [e]	▪ 110 chambers [f]	None
Service or bulk TAP service [g]	Contains: ▪ a service bay for TeraPorter maintenance ▪ power supplies ▪ an SCM ▪ chambers for magazine storage	▪ 50 chambers	▪ 42 chambers	None

a. A single magazine is stored in each chamber. Each magazine contains 10 slots for LTO cartridges.
b. A single magazine is stored in each chamber. Each magazine contains nine slots for TS11*xx* technology or T10K cartridges.
c. The TAP cannot be used for magazine storage.
d. Including non-isolating service frame configurations.
e. For a non-isolating service frame, 52 chambers are in the exclusion zone. See Service Frame on page 18.
f. For a non-isolating service frame, 44 chambers are in the exclusion zone. See Service Frame on page 18.
g. The bulk TAP service frame also includes a bulk TAP carousel with 14 chambers. The TAP carousel cannot be used for magazine storage.

CHAPTER 2

Site Requirements

This chapter describes the site requirements for the library. Make sure that the location where the library will be installed meets these requirements before the field engineer arrives to install the library.

PHYSICAL REQUIREMENTS

The following physical requirements apply to the location where the library will be installed. Meeting these requirements sets the necessary parameters for successfully operating the library, as well as ensuring adequate clearances for, maintenance access to, and expansion of the library.

Data Center Flooring

The flooring where you plan to install the library is an important part of the installation and operation planning. Make sure that it has adequate structural integrity to handle the weight and leveling requirements of the library.

WARNING

Library frames are very heavy (see product specifications for details). Use extreme caution and proper equipment when moving these, and ensure that your floor has adequate structural integrity.

Library Weight The following table shows the size and weight specifications for the library frames and other components.

Notes:
- All dimensions and weights are approximate.
- To calculate the approximate weight of a loaded library, calculate the total weight for all of the frames and then add the weight for each drive, RIM, and power supply, plus the weight of each TeraPack magazine full of cartridges.
- When calculating space requirements, include the service access requirements described in Service Access Requirements on page 27.

Parameter	Specification				
	Main Frame	**Drive Expansion Frame**	**Media Expansion Frame**	**Non-Isolating Service Frame**	**Service Frame**
Height [a]	79.125 to 82 in. (201.0 to 208.3 cm)				
Width	29 in. (73.7 cm)			34 in. (86.4 cm)	31 in. (78.7 cm)
Depth [b]	43 in. (109.2 cm)				
Weight [c, d]	6D0T: 821 lb (372 kg) 3D3T: 810 lb (367 kg)	6D0T: 763 lb (346 kg) 3D3T: 750 lb (340 kg)	564 lb (256 kg)	564 lb (256 kg)	Standard: 737 lb (334 kg) Bulk TAP: 824 lb (374 kg)
Each drive (with drive sled)	▪ LTO-4: 11.5 lb (5.2 kg) ▪ LTO-5: 11.6 lb (5.3 kg) ▪ LTO-6: 11.6 lb (5.3 kg) ▪ LTO-7: 11.2 (5.1 kg) ▪ LTO-8: 11.0 (5.0 kg) ▪ LTO-9: 11.0 (5.0 kg) ▪ LTO-10: 11.0 (5.0 kg) ▪ TS11*xx* technology: 17.5 lb (8 kg)		N/A	N/A	N/A
Each TeraPack magazine	▪with ten LTO cartridges: 5.1 lb (2.3 kg) ▪with nine TS11*xx* technology cartridges: 5.6 lb (2.5 kg)				
Each RIM	5 lb (2.3 kg)		N/A		N/A
Each power supply	4 lb (1.8 kg)		N/A		4 lb (1.8 kg)

a. The height of each frame can be adjusted to allow frame-to-frame leveling on uneven floors.
b. This dimension is for the frame with the front and back cover panels installed.
c. These weights are with no RIMs, drives, or media installed.
d. 6D0T means six Drive Bay Assemblies and zero TeraPack Bay Assemblies. 3D3T means three Drive Bay Assemblies and three TeraPack Bay Assemblies or shelves.

The following table shows the fully loaded maximum weight of each frame type.

Frame Type [a]	Maximum Weight for LTO Frame	Maximum Weight for TS11*xx* Technology Frame
6D0T Main Frame	1574 lb (714 kg)	1641 lb (744 kg)
3D3T Main Frame	1461 lb (663 kg)	1578 lb (716 kg)
6D0T Drive Frame	1561 lb (708 kg)	1627 lb (738 kg)
3D3T Drive Frame	1447 lb (656 kg)	1569 lb (712 kg)
Media Frame	1227 lb (557 kg)	1180 lb (535 kg)
Service Frame	1000 lb (454 kg)	980 lb (445 kg)
Bulk TAP Service Frame	1087 lb (493 kg)	1067 lb (484 kg)

a. 6D0T means six Drive Bay Assemblies and zero TeraPack Bay Assemblies. 3D3T means three Drive Bay Assemblies and three TeraPack Bay Assemblies or shelves.

Data center floors may require reinforcement to hold the library's weight. Check your site's flooring for load-bearing specifications.

Caution Spectra Logic is not responsible for damage caused to the library or its surroundings if the floor is not adequately reinforced. Inadequate floor reinforcement can allow the library to sag, causing misalignment of the frames and robotic motion failures.

Weight-Distribution Plate If you would like to install the library on a weight-distributing plate, Spectra Logic recommends a steel plate with the minimum dimensions of 36 x 30 x 0.25 inches (91.4 x 76.2 x 0.6 cm). Plates should be placed under the feet at the front and back of each frame junction and under the outer feet of the right-most and left-most frames of a multi-frame library.

Note: After determining the positions for the plates, attach them to the floor to prevent them from moving as you roll the frames into place.

Flooring Type The floor where the library is to be installed must be level, and must be hard flooring, such as cement or tile — do not install the library on carpeting. This requirement is particularly important when installing a multi-frame library, because all frames must be precisely aligned. Carpeting also increases the risk of static discharge when operating the library.

Caution The library must be installed on a level, hard-surfaced floor such as cement or tile.

A small amount of floor unevenness can be compensated for using the levelers on each library frame.

Space Requirements

The base TFinity library consists of a main frame and two service frames or right and left media expansion frames. It can be expanded by adding multiple additional frames. The service frames or right and left media expansion frames must always be the left-most and right-most frames.

Important A minimum of 2 feet (0.6 m) of clearance is required on the ends of the library to provide access to the service frames. If data center equipment is on rolling racks and can be easily moved to provide the clearance on each end of the library, then having equipment adjacent to the ends of the library is acceptable. In addition, a minimum of 2 feet (0.6 m) of clearance at the front and back of the main frame, each drive expansion frame, and each service frame is required for airflow and accessibility. Providing 3 feet (0.9 m) of clearance on all sides of the library is highly recommended.

Important The service frames, regular or bulk TAP, must be at the two ends of the library; the other frames can be placed in any order. Discuss the actual layout with your Spectra Logic Professional Services representative.

For example, Figure 6 shows the total space required for an eight frame library, including the minimum access clearance.

Note: All dimensions are rounded to the nearest tenth.

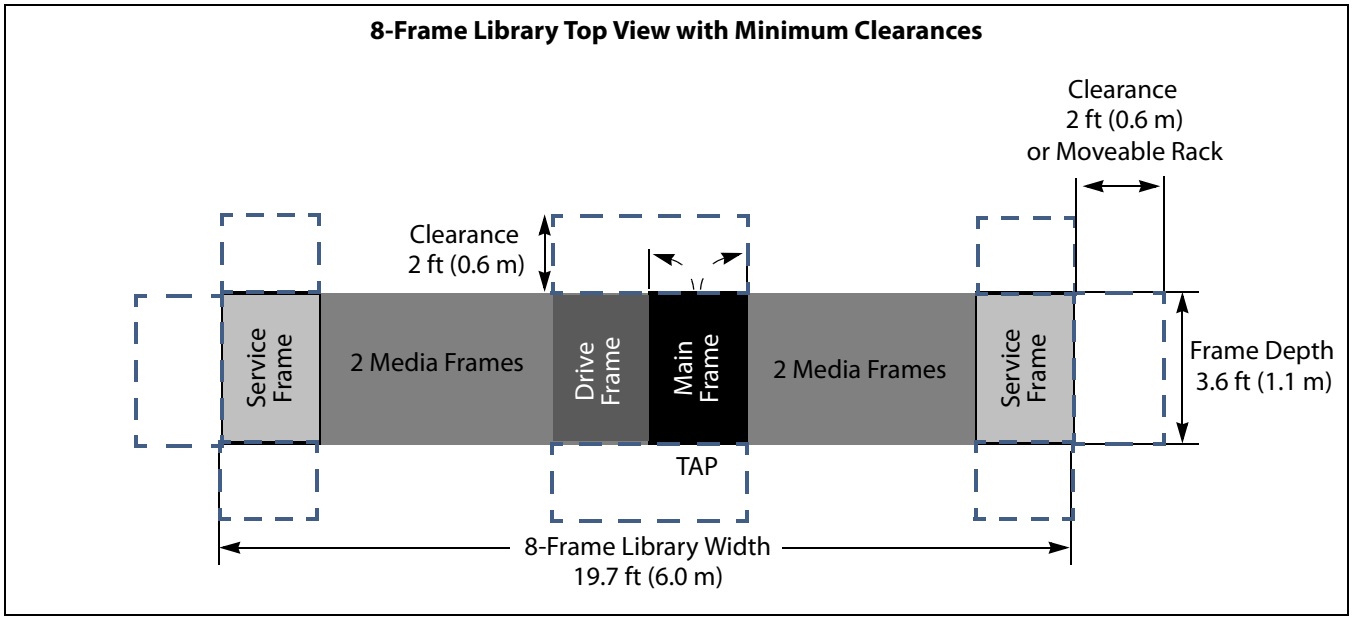


Figure 6 Dimensions of an eight-frame TFinity, including minimum service access.

Service Access Requirements

Minimum Access Requirements A minimum of 2 feet (0.6 m) of clearance is required on the left and right ends of the library to provide service access to the service frames. If data center equipment is on rolling racks and can be easily moved to provide the clearance on each end of the library, then having equipment adjacent to the ends of the library is acceptable. In addition, a minimum of 2 feet (0.6 m) of clearance at the front and back of the main frame, each drive expansion frame, and each service frame is required for airflow and service and operator access.

The library depth is 3.6 feet (1.1 m). The depth for the library main frame, each drive expansion frame, and each service frame plus the 2 feet (0.6 m) of required access space front and back is 7.6 feet (2.3 m).

Recommended Access Requirements Providing 3 feet (0.9 m) of clearance on all sides of the library is recommended.

The library depth is 3.6 feet (1.1 m). The depth for the library main frame, each drive expansion frame, and each service frame plus the 3 feet (0.9 m) of recommended access space front and back is 9.6 feet (2.9 m).

The following table shows the width requirements for multi-frame libraries plus the minimum and recommended access space on each side of the library. For libraries greater than ten frames, add 2.42 ft. (0.74 m) for each additional frame.

Note: If data center equipment is on rolling racks and can be easily moved to provide the clearance on each end of the library, then having equipment adjacent to the ends of the library is acceptable.

Number of Frames [a]	Library Width [b]	Width with Minimum Service Access [b]	Width with Recommended Service Access [b]
Three Frames	7.6 ft (2.3 m)	11.6 ft (3.5 m)	13.6 ft (4.1 m)
Four Frames	10 ft (3.0 m)	14 ft (4.3 m)	16 ft (4.9 m)
Five Frames	12.4 ft (3.8 m)	16.4 ft (5.0 m)	18.4 ft (5.6 m)
Six Frames	14.8 ft (4.5 m)	18.8 ft (5.7 m)	20.8 ft (6.3 m)
Seven Frames	17.3 ft (5.3 m)	21.3 ft (6.5 m)	23.3 ft (7.1 m)
Eight Frames	19.7 ft (6.0 m)	23.7 ft (7.2 m)	25.7 ft (7.8 m)
Nine Frames	22.1 ft (6.7 m)	26.1 ft (8.0 m)	28.1 ft (8.6 m)
Ten Frames	24.5 ft (7.5 m)	28.5 ft (8.7 m)	30.5 ft (9.3 m)

a. All dimensions are rounded to the nearest tenth.

b. A non-isolating service frame configuration with right and left media expansion frames instead of service frames adds an additional 0.5 ft (0.2 m) to the width of the library.

Floor and Ceiling Cable Access

Figure 7 through Figure 9 on page 29 provide the dimensions for cable access holes for main, drive expansion, and service frames. See Figure 12 on page 38 to see the location of these access holes in a frame. The dimensions are different for the floor and ceiling access holes. Be sure to consider the structural integrity of the floor and the location of casters and leveling feet (see Figure 10 on page 30), before cutting holes in the floor for access.

WARNING

Library frames are very heavy (see product specifications for details). Use extreme caution and proper equipment when moving these, and ensure that your floor has adequate structural integrity.

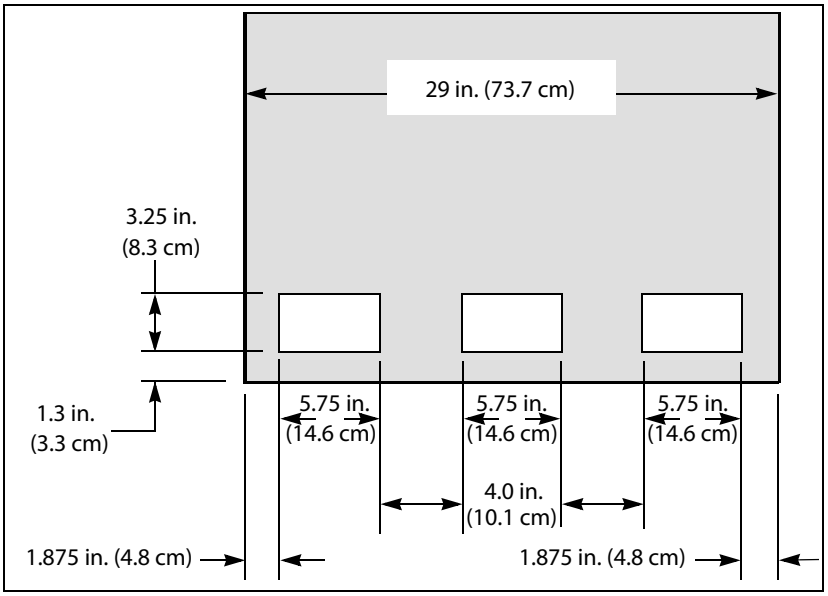


Figure 7 Ceiling cable access for main and drive expansion frames.

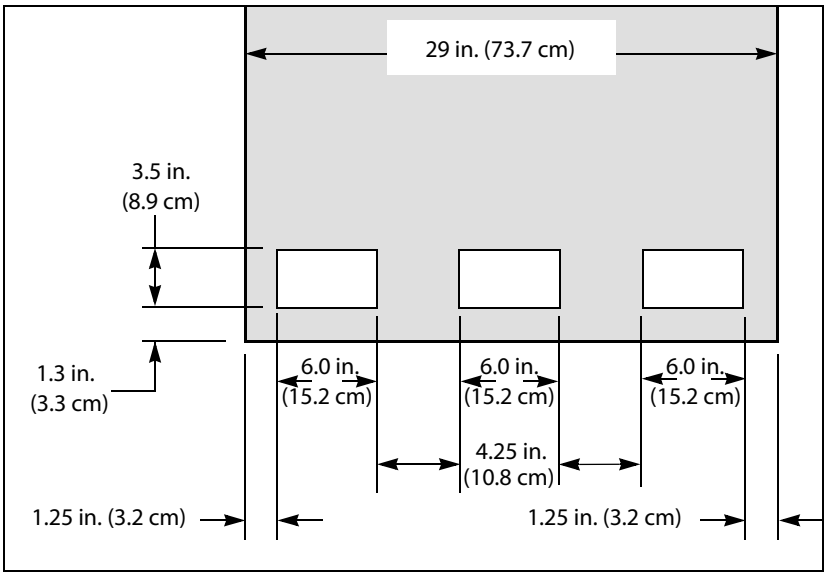


Figure 8 Floor cable access for main and drive expansion frames.

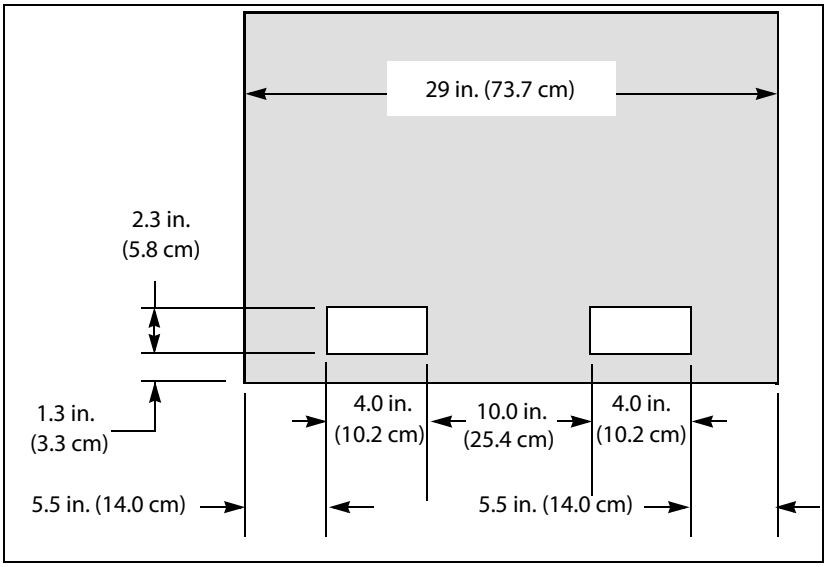


Figure 9 Ceiling cable access for service frames.

Figure 10 shows the location of casters and leveling feet for each library frame, relative to the sides of the frame.

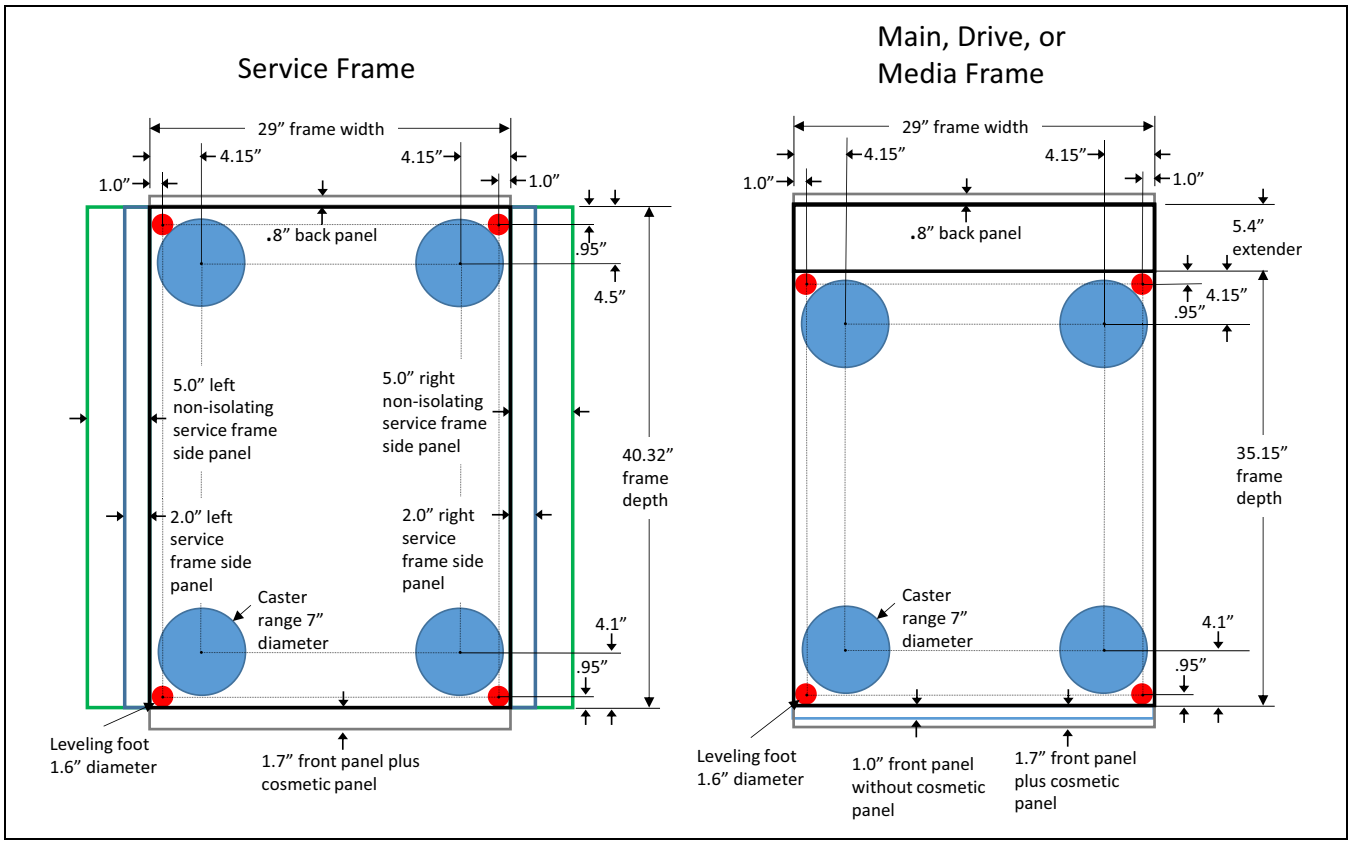


Figure 10 Caster and leveling feet locations.

POWER REQUIREMENTS

Input Power Requirements

Optional Power Distribution Unit

Optionally, a Power Distribution Unit (PDU), with or without a power meter, can be purchased for the TFinity library to distribute power from one three-phase power drop to all of the Dual AC power modules in the library. If included in the library, the PDU is attached to the back of the main frame or a drive frame. An electrician is required to wire the PDU to your facility AC and power cords from the all of the dual AC units in the tape library are plugged into the PDU. The PDU meets all Dual AC Power Requirements.

Dual AC2 Power Requirements

Caution The requirements below are for the Dual AC2, which currently ships with new libraries. If you are preparing a site for moving an existing library with a different Dual AC power module, contact Spectra Logic Technical Support (see Contacting Spectra Logic on page 8) for instructions.

The main frame and drive expansion frames include dual AC power modules. When using a redundant power configuration, connect each input on the dual AC power module to a separate branch circuit, which allows for failover in the event of a power failure in one of the circuits.

Dual AC2 Line to Neutral Testing

For voltages above 140VAC Line to Neutral, it is critical that the power cords for the Dual AC2 have Neutral and Line assigned to the correct contacts.

WARNING

Line voltage exists at these connectors.

Only qualified personnel should attempt to conduct this test.

Use extreme caution when taking measurements.

The instructions below use the contact locations shown in Figure 11.

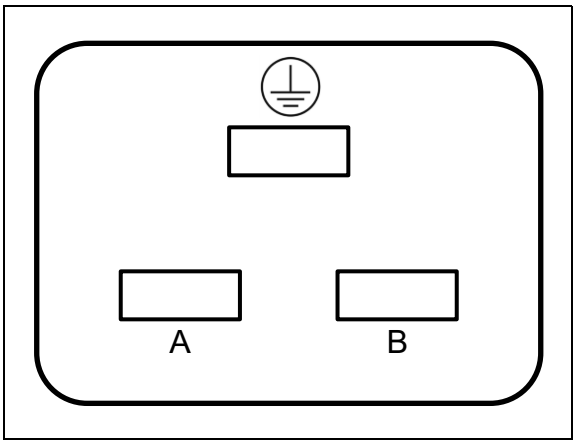


Figure 11 C19 connector contact layout.

1. Using a voltmeter set to a range that includes 500 VAC, measure the voltage between ground and the contact labeled “A”.
   a. Insert one probe into the contact labeled with the ground symbol inside a circle in the image.
   b. Insert the other probe into the contact labeled “A”.
   c. Record the measurement.
2. Repeat Step 1 for the contact labeled “B”.

3. Repeat Step 1 through Step 2 for the second power cord.
   - If any of the measurements **are greater than 250 VAC**, **STOP**, inform the electrician that there is a problem, and do not proceed to connect power cords to the library until this has been resolved.
   - If any of the measurements **are greater than 140 VAC but less than 250 VAC**, then continue Verify Contact "A" is a Neutral.
   - If all of the measurements **are less than 140 VAC**, continue with Verify Line to Line Voltage.

Verify Contact "A" is a Neutral

1. Using the measurements taken in Step 1, determine if contact "A" is a Neutral.
   - If contact "A" for either power cord **measures greater** than 10 VAC, **STOP**, inform the electrician that there is a problem with the Neutral and line assignments, and do not proceed to connect power cords to the library until this has been resolved.

Caution

It is critical that the Neutral conductor be assigned the left position on the connector on each power cord connector. Damage to the Dual AC2 will result if the Neutral is not correctly assigned.

   - If contact "A" for both power cords **measures less** than 10 VAC, continue with the next step.
2. Measure the Neutral to Neutral voltage for the two power cords.
   a. Using a voltmeter set to a range that includes 250 VAC, insert one probe into the contact labeled "A" of one AC power cord.
   b. Insert the other probe into the contact labeled "A" of the other AC power cord.
   c. The measurement must be less than 10 VAC.
      - If the measurement **is greater** than 10 VAC, **STOP**, inform the electrician that there is a problem, and do not proceed to connect power cords to the library until this has been resolved.
      - If the measurement **is less** than 10 VAC, the AC power cords are ready to be connected to the library.

Verify Line to Line Voltage

If neither of the measurements are greater than 140 VAC, then measure the voltage between contact "A" and contact "B".

1. Using a voltmeter set to a range that includes 250 VAC, insert one probe into contact "A".
2. Insert the other probe into contact "B".

3. The measured value should be 190 to 260 VAC.
   - If the measurement **is not** between 190 to 260 VAC, **STOP**, inform the electrician that there is a problem, and do not proceed to connect power cords to the library until this has been resolved.
   - If the measurement **is** between 190 to 260 VAC, then repeat Step 1 to Step 3 for the second power cord. If the measurement **is** between 190 to 260 VAC for the both power cords, the AC power cords are ready to be connected to the library.

Power Rating

Each library frame is rated at 200-240 VAC at 16 amps (3840 watts maximum). This power rating is based on a main frame with 24 LTO drives and 6 RIMs, which is the configuration for maximum power consumption by a single frame. The frames are *not* rated at 120 VAC due to the high current required to supply the product.

Power Cord Specifications

The power cords included with the library are considered part of the library and are not intended for use with any other equipment. See Supply-End Connector Types on page 34 for the different types of cords available from Spectra Logic.

Notes:
- The supply-end connector is considered the disconnect for the unit. Make sure that the socket-outlet for the AC connection is in an accessible location near the library.
- The power cord must meet the specifications for the country where the library will be installed.

North America and Korea 200–240 VAC Power Cord The criteria for a 200-volt to 240-volt AC power cord in North America and Korea are as follows:

Parameter	Specification
Power cordage	SJT type, three-conductor, 14 AWG minimum [a]
Power input connectors	▪ **Male:** Connector must be of the proper type, rating, and safety approval (see Supply-End Connector Types on page 34). ▪ **Female:** IEC 60320 C19

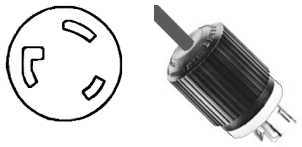
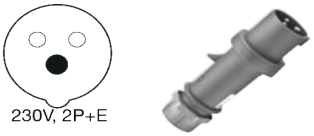
a. Power cord must comply with local electrical code.

International 200–240 VAC Power Cord The criteria for an international 200-volt to 240-volt AC power cord are as follows:

Parameter	Specification
Power cordage	Flexible, HAR (harmonized) type H05VV-F, three conductor, cord with minimum conductor size of 1.7 square millimeters (0.0026350 square inches).
Power input connectors	▪ **Male:** Connector must be of the proper type, rating, and safety approval for the intended country (see Supply-End Connector Types on page 34). ▪ **Female:** IEC 60320 C19

Supply-End Connector Types

The supply-end connector on the cord depends on the country where the library will be installed. The following table shows the supply-end connector types used in each country.

Part Number	Country of Use	Plug Style	Length	Appearance
9594	North America, Korea	NEMA L6-20P	14.8 ft (4.5 m)	
7029	North America, Korea	NEMA L6-30P	14.8 ft (4.5 m)	
6807	Japan	NEMA L6-20P	13.9 ft (4.24 m)	
8665	United Kingdom, Continental Europe	IEC 60309	15 ft (4.6 m)	

Grounding Requirements

Due to electromagnetic interference (EMI) filtering in each dual AC power module, the leakage current for main frames and drive frames is such that they require a secure connection from the chassis of the unit to an earth ground.

Use one or more of the following methods for securing a ground connection when installing a main frame or drive frame:

Notes:
- Cord lock brackets and cords with locking connectors are not compatible and cannot be used simultaneously.
- Expansion Frame Power Modules do not require locking cords or special grounding.

- Add cord lock brackets (Spectra Logic part number 5497) to all main and drive frames. See 'Installing Cord Locks' in the *Spectra TFinity Library User Guide* for more information.
- Use a cord with locking connectors at both ends, such as L6-20P to locking C19 (Spectra Logic part number 9594).

Power Outlet Location The twist lock supply-end connector is considered the power disconnect for the unit. The outlet must therefore be installed in an accessible location near the library.

Power Receptacles The power receptacles for the main frame and the drive expansion frames are located in the lower right-hand corner of the frame as you face the back of the library (see Figure 2 on page 17).

The following table shows the number of power receptacles on each frame type.

Frame Type	Number of Power Outlets
Main Frame	2 [a]
Drive Expansion Frame	2 [a]
Service Frame	2 [a]
Media Expansion Frame	0
Bulk TAP Media Frame	0

a. The second connection is the redundant or failover connection.

Power Consumption and Cooling Requirements

The power and cooling requirements for the library depend on the number and type of drives installed. The following table provides the maximum power consumption and heat load for the base library and for each additional component added to the base library. Use this information to calculate the total maximum power consumption and heat load values, which can be used to build a power budget for the library.

All values are measured at the AC input and include power supply efficiency. The values are averages of observed hardware. In general, the lighter the load on the power supplies, the less efficient they are. The power supply efficiency in turn affects the power draw of all components.

Component	Power Consumption (watts)	Heat Load, Continuous (BTU/hour)
Minimum Library (3-frame with service frames) [a]	613	2093
Minimum Library (3-frame with right and left media frames) [b]	423 Estimated	1750
Drive frame [c]	153	522
Media frame	30	102
Bulk TAP frame	21	72
5/12 VDC power supply	33	113
24 VDC power supply	29	99
RIM	12	41
LTO-10 Fibre Channel Full-Height	**Read/write:** 40	**Read/write:** 136
LTO-10 Fibre Channel or SAS Half-Height	**Read/write:** 40	**Read/write:** 136
LTO-9 Fibre Channel Full-Height	**Read/write:** 35	**Read/write:** 119
LTO-9 Fibre Channel or SAS Half-Height	**Read/write:** 35	**Read/write:** 119
LTO-8 Fibre Channel Full-Height	▪ **Read/write:** 40 ▪ **Idle:** 15 [d]	**Read/write:** 136
LTO-8 Fibre Channel or SAS Half-Height	▪ **Read/write:** 43 ▪ **Idle:** 14 [c]	**Read/write:** 146
LTO-7 Fibre Channel Full-Height	▪ **Read/write:** 31 ▪ **Idle:** 20 [c]	**Read/write:** 106
LTO-7 Fibre Channel or SAS Half-Height	▪ **Read/write:** 31 ▪ **Idle:** 20 [c]	**Read/write:** 106

Component	Power Consumption (watts)	Heat Load, Continuous (BTU/hour)
LTO-6 Fibre Channel	▪ **Read/write:** 28 ▪ **Idle:** 8 [c]	**Read/write:** 95
LTO-5, Fibre Channel	▪ **Read/write:** 37 ▪ **Idle:** 19 [c]	**Read/write:** 126
LTO-4, Fibre Channel	▪ **Read/write:** 37 ▪ **Idle:** 17.5 [c]	**Read/write:** 123
TS1160 technology	▪ **Read/write:** 67 ▪ **Idle:** 35 [c]	**Read/write:** 229
TS1155 technology	▪ **Read/write:** 60 ▪ **Idle:** 19 [c]	**Read/write:** 205
TS1150 technology	▪ **Read/write:** 55 ▪ **Idle:** 38 [c]	**Read/write:** 188
TS1140 technology	▪ **Read/write:** 53 ▪ **Idle:** 30 [c]	**Read/write:** 181

a. Includes two 24 VDC and two 5/12 VDC power supplies in the main frame, and two service frames each with two 24 VDC power supplies; no drives or RIMs installed.

b. Includes two 24 VDC and two 5/12 VDC power supplies in the main frame and right media expansion frame and left media expansion frame in non-isolating service frame configurations.

c. Includes one 24 VDC power supply; no drives or RIMs installed.

d. No cartridge loaded.

NETWORK CABLING REQUIREMENTS

The library can accommodate cabling from either the bottom or the top of the library. See Floor and Ceiling Cable Access on page 28 for additional information.

Use Figure 12 and the descriptions that follow to plan network connectivity for the library installation.

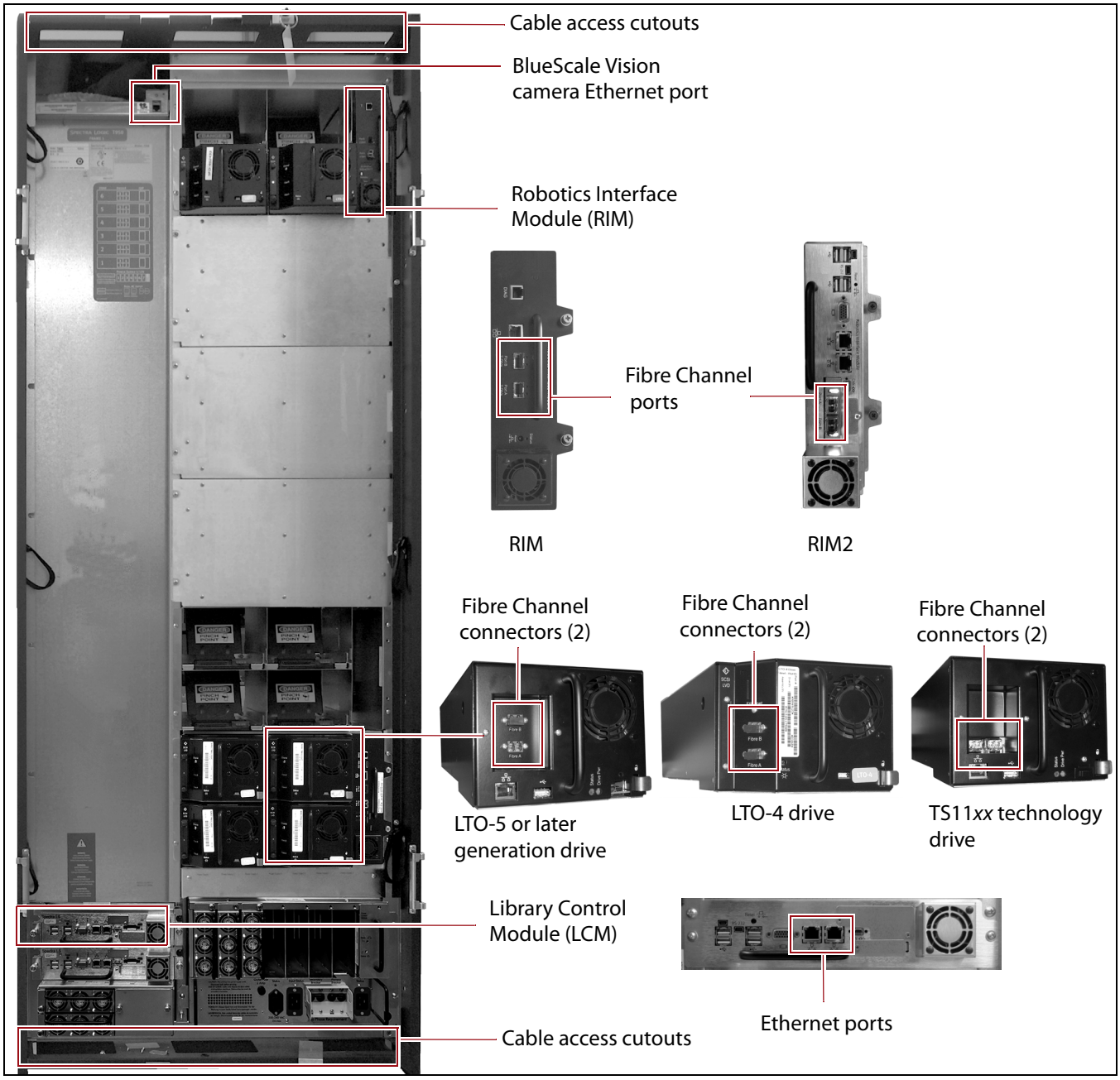


Figure 12 Locations for network cable connections.

Library Access Provide a Category 5 (10/100BaseT connection) data-grade Ethernet cable that is compliant with EIA/TIA 568 from an active Ethernet network to be connected to an Ethernet port (each Ethernet port is a pin-through-hole RJ-45 shielded connector) on the LCM to support remote access to the library's LumOS web interface and to allow the library to automatically email notifications to users and AutoSupport tickets to Spectra Logic Technical Support. During installation, the library's connection is set up with the library's IP address, subnet, proxy server, and other IP configuration settings.

Caution Some port scanning software can interfere with remote library sessions.

Host Access Provide one or two optical fiber cables from the arbitrated loop or switched fabric, to Fibre Channel port(s) on a RIM in each partition to provide the hosts with access to the partitions. Depending on the wavelength, the cables must comply with the following specifications in the Fibre Channel standard (FC-PI-2):

- **50-micron**—400-M5-SN-I classification
- **62.5 micron**—400-M6-SN-I classification (not supported for RIM2)

Tape Drive Access

- **Fibre Channel**

  Provide one optical fiber cable from the arbitrated loop or switched fabric, to a Fibre Channel port on each drive, to provide the hosts with access to the partitions. Depending on the wavelength, the cables must comply with the following specifications in the Fibre Channel standard (FC-PI-2):

  - **50-micron**—400-M5-SN-I classification
  - **62.5 micron**—400-M6-SN-I classification (not supported for LTO-6 or later generation drives or TS11*xx* technology drives)

  Use the following table to determine the maximum length for an M5 cable.

Data Rate / Link Speed	M5 (OM2) cable	M5E (OM3) cable	M5F (OM4) cable
1 Gbps	1640 ft (500 m)	Not Specified	Not Specified
2 Gbps	984 ft (300 m)	Not Specified	Not Specified
4 Gbps	492 ft (150 m)	1247 ft (380 m)	1312 ft (400 m)
8 Gbps	164 ft (50 m)	492 ft (150 m)	623 ft (190 m)

- **Serial Attached SCSI (SAS)**

  SAS tape drives support the point-to-point Serial Attached SCSI protocol.

  LTO-7 and LTO-8 - Connecting these drives to the host network requires an SFF-8088 SAS cable rated for 6 Gb/second that does not exceed 13 feet (4 m).

  LTO-9 and LTO-10 - Connecting these drives to the host network requires an SFF-8644 SAS cable rated for 12 Gb/second that does not exceed 13 feet (4 m).

BlueScale Vision Camera Access One BlueScale Vision camera is included with the main frame. Additional cameras can be installed in the expansion frames. To comply with EMC requirements, provide a shielded Category 5 (10/100BaseT connection) data-grade cable or a similar Category 5 cable from an active Ethernet network to each camera.

ENVIRONMENTAL REQUIREMENTS

The following sections list the general environmental specifications for the library.

Air Flow Air flows through the library from front to back. In data centers using a hot aisle/cold aisle layout, position the library so that the cold aisle is in front of the library (cold air in), and the hot aisle is behind the library (hot air out).

Air Quality Keep the location as free of airborne particulates as possible. To eliminate obvious sources of particulates, do not permit anyone to smoke, eat, or drink near the storage area, and do not place the library near a copier or printer that may emit toner and paper dust.

Temperature, Humidity, and Altitude The library is equipped with internal fans that operate as much as is necessary for the number of DBAs installed. The fans keep the library's internal temperature within specifications as long as the data center environment is within specifications. The following table outlines the necessary data center and storage area specifications.

Operating Environmental Specification	
Humidity	20% to 80% (non-condensing)
Humidity gradient	Less than 10% per hour
Ambient temperature	**LTO:** 50° F to 90° F (10° C to 32° C) **TS11*xx* Technology:** 61° F to 90° F (16° C to 32° C)
Maximum temperature change rate [a]	18° F per hour (10° C per hour), non-condensing
Maximum wet bulb temperature	77° F (25° C)
Altitude	Sea level to 10,000 ft (3,048 m)

a. The temperature and humidity must be allowed to stabilize in the specified ambient environment for 24 hours.

Storing [a] and Shipping (Non-Operating) Environment Specification	
Humidity	10% to 95% (non-condensing)
Temperature	–40° F to 149° F (–40° C to 65° C)
Altitude	Sea level to 40,000 ft (12,192 m)

a. The library is in its original packaging. The packaging is designed to protect the library from condensation caused by extreme temperature variations of 27° F (15° C) or more. When the library is moved from a cold storage environment to a warm operating environment, it must be acclimated in its packaging for at least 24 hours before opening to prevent serious condensation damage from occurring.

Fire Protection To comply with the OSHA Directive for Fixed Extinguishing Systems (General, 1910.160), the library has a punch-out in the cover for each frame and a corresponding cut-out in the top of each frame for the purpose of attaching a hose or nozzle from your site's fixed extinguishing system.

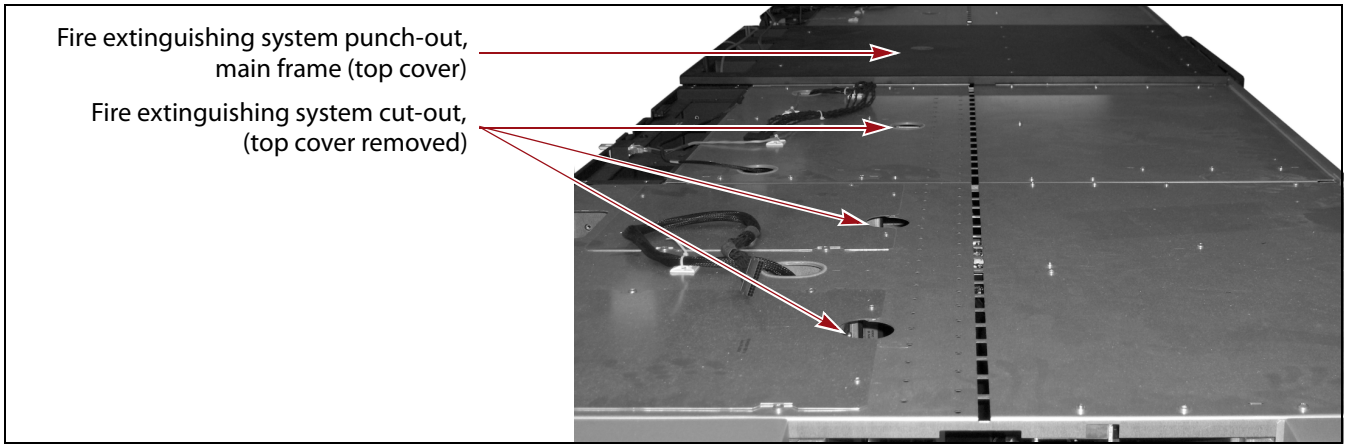


Figure 13 Location of the fire extinguishing system access opening in top of library.

Shock and Vibration The library will operate normally after experiencing shock loads as specified in the following table. The operating shock levels indicate how much shock the library can withstand while the enclosed drives are reading and writing data. The non-operating and storage shock levels indicate how much shock the library can withstand when it is not operating. After experiencing this amount of shock, the library will operate normally.

Specification	Operating	Storing and Shipping (Non-Operating Environment) [a]
Shock	2 g pk ½ sine wave for 10 msec (3 axes, 2 shocks per axis, minimum)	2 g pk ½ sine wave for 10 msec (3 axes, 2 shocks per axis, minimum)
Vibration (Swept Sine)	5 Hz – 500 Hz – 5 Hz 5 – 22 Hz, 0.01-inch DA displacement 22 – 500 Hz, 0.25G pk @ ½ octave (minimum three axes)	5 Hz – 500 Hz – 5 Hz 5 – 31 Hz, 0.02-inch DA displacement 31 – 500 Hz, 1G pk @ ½ octave (minimum three axes)
Vibration (Random)	0.5 Grms, 0 – 3000 Hz (single axis)	1 – 200 Hz @ 1.156 Grms. Bottom face only for 60 minutes.

a. Specifications are for the library in its original packaging.

CHAPTER 3

Preparing for Installation

The library will be installed by a certified Spectra Logic field engineer. This chapter outlines the requirements for storing and moving the library and its components. Make sure that you review these requirements carefully. The information is provided to ensure that the installation site meets the necessary requirements *before* the Spectra Logic field representative arrives.

WARNING Library frames are very heavy (see product specifications for details). Use extreme caution and proper equipment when moving these, and ensure that your floor has adequate structural integrity.

WARNING Boxed and unboxed library components weigh from 200 to 400 pounds each (91 to 181 kg) or more. Use extreme caution and proper equipment when moving these.

WARNING The ties around the shipping crates are secured very tightly; the tension may cause them to whip outward when cut. Use care when cutting the ties so that you will not be hit.

RECEIVING AND STORING THE LIBRARY

Before the library arrives, make sure that your receiving and storage areas can accommodate the pallet and boxes used to ship the library and its components. The library is shipped in multiple boxes: one for each library frame and others for the library components such as drives, controllers (RIMs), TeraPack magazines, and media. The boxes are shipped on pallets. The following table provides the approximate dimensions and weights of the pallet and boxes used to ship the library.

	Height	Width	Depth	Weight
Crated Frame [a]	7.2 ft (2.2 m)	3.5 ft (1.1 m)	4.6 ft (1.4 m)	1,200 to 1,300 lb [b] (544 to 590 kg)
Crated TeraPorter [c]	6.8 ft (2.1 m)	2.6 ft (0.8 m)	2.1 ft (0.6 m)	200 lb (91 kg)
Component Pallet [d, e]	1.8 to 5 ft (0.6 to 1.5 m)	3.5 to 14.9 ft (1.1 to 4.6 m)	1.8 to 5 ft (0.6 to 1.5 m)	200 to 400 lb (91 to 181 kg)

a. Each frame is shipped in a separate crate. The accessory box might ship with the main frame.
b. The weight does not include drives, media, RIMs, TeraPorter, or power supply modules.
c. Each TeraPorter ships in a separate crate.
d. Assumes multiple components are shipped together on a single pallet. Components may also be shipped individually.
e. The size and weight of the component pallet depends on the number and type of components shipped. To calculate the approximate weight of all the components, add 12 lb (5.4 kg) for each drive, 5 lb (2.3 kg) for each TeraPack magazine full of media, 5 lb (2.3 kg) for each RIM, and 4 lb (1.8 kg) for each power supply.

In preparation for the installation, locate the accessory box, which may have shipped and arrived separately from the library. This box contains option activation keys, the library documentation kit, and additional information that you should read before the library is installed. Make sure that you do not lose any of the option activation keys.

Acclimating the Library

Allow time for the library to acclimate to the working environment when you move it from the loading dock.

Caution

When the library is moved from a cold storage environment to a warm operating environment, it must be acclimated in its packaging for at least 24 hours before opening to prevent serious condensation damage from occurring.

UNPACKING AND MOVING THE LIBRARY

The following sections describe the requirements to safely unpack and maneuver library and component crates from storage to their operating location.

Caution Keep all library and components crated while moving them to the data center. If the data center is not able to accommodate the crates, contact Spectra Logic Professional Services in advance of the installation date. See Contacting Spectra Logic on page 8.

Structural Integrity of Flooring

Ensure that all floors that will be traversed can withstand the weights of the crated components shown in Receiving and Storing the Library on page 44.

Required Equipment

Ensure that any equipment used to move the library components can transport the weights shown in Receiving and Storing the Library on page 44.

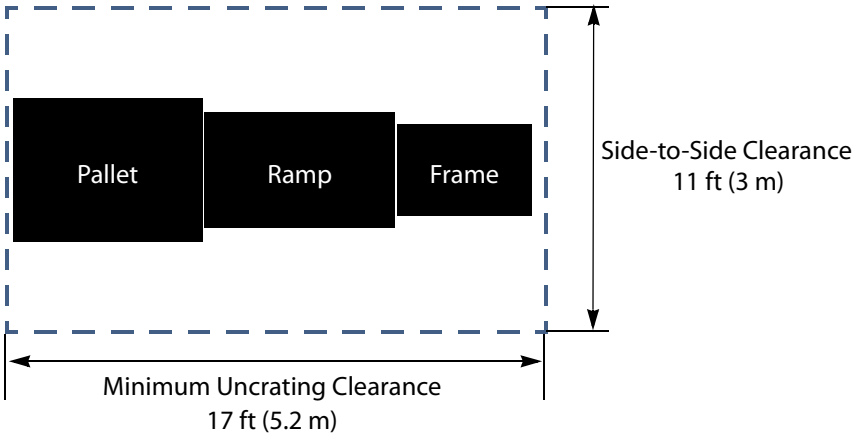
Level Surfaces A pallet jack or forklift is required to move the crates on a level surface.

Stairways A stair crawler or other special equipment must be used to traverse stairways. A ramp can sometimes be used to traverse one or two stairs.

Clearances

Before moving the library and components to where they will be installed, make sure that you have access to necessary doorways, stairways, hallways, and elevators, as well as adequate clearance to move through them with the equipment.

Note: All lengths are approximate.

Clearance for...	Requirement
Unpacking	Sufficient space to both remove the library from its packaging and unpack the boxes containing the additional components.  ▪ Allow a minimum of approximately 17 feet (5.2 m) on the ramp side of the pallet to unload the library and approximately 4 feet (1.2 m) on each side and above the crate to remove the packaging. ▪ Allow a minimum of 12 feet by 12 feet (3.6 m by 3.6 m) of open space for maneuvering the individual frames from their crates.
Doorways	Doorways (including thresholds) must be taller than 6.7 feet (2 m) and wider than 4 feet (1.2 m).
Stairwell width and height	Stairwells must be taller than 7.5 feet (2.3 m) and wider than 4 feet (1.2 m).
Stairwell and hallway corners	Stairway and hallway corners should be wider than 5.6 feet (1.7 m).
Elevator width and height	Elevators and elevator doors should be taller than 7.5 feet (2.3 m) and wider than 4 feet (1.2 m). If using an elevator to move the crates, it must be able to accommodate the length of the crate containing each TeraPorter.

Tilting

Make sure that you do not tilt the frames from vertical while moving them.

Caution If you tilt the library, Spectra Logic is not responsible for any damage caused to the library or its components, or for any damage caused to your site.

MOVING THE LIBRARY AFTER INSTALLATION

The library hardware is configured to ensure proper thermal control, air flow, and dust filtering. After the library is installed, do not move the library.

Important Moving the library without assistance from a Spectra Certified field engineer will void your service contract. Contact Spectra Logic Professional Services for assistance if you need to relocate your library (see Contacting Spectra Logic on page 8).

Contact Spectra Logic Technical Support before making any changes to your library hardware or performing any service operations.

Site Preparation Checklist

Use this checklist to ensure that all of the requirements have been met prior to delivery of your library.

Site Requirements	
Data Center Flooring on page 23	
☐	Flooring is hard (not carpeted) and capable of supporting the weight of the library.
☐	Weight distribution plates have been installed (optional).
☐	Flooring is level.
Space Requirements on page 26	
☐	Space is available for the library's height, width, and depth.
☐	Space is available for service and operator access.
☐	Space is available for future growth (optional).
☐	Cables can be routed to the library's cable access areas.
Power Requirements on page 30	
☐	Electrical and peripheral equipment cabling is complete and organized.
☐	Proper number and type of outlets are available at the required locations.
☐	Electrical circuits meet power requirements.
☐	Two separate branch circuits are available to allow for failover in the event of a power failure in one of the circuits (optional).
Network Cabling Requirements on page 38	
☐	Cabling for remote access to the library's LumOS web interface is complete and organized.
☐	Cabling for host access to the library is complete and organized.
☐	Cabling for host access to the tape drives is complete and organized.
☐	Cabling for access to the BlueScale Vision Camera(s) is complete and organized.

Environmental Requirements on page 40	
☐	Airflow and air quality meet the library's specifications.
☐	Temperature and humidity are within the library's specifications.
☐	Fire suppression equipment is in place.
☐	Vibration and shock will not exceed the library's specifications.
Preparing for Installation	
Receiving and Storing the Library on page 44	
☐	The receiving/storage area can handle the size and weight of each crated library frame as well as the crate of library components.
☐	The delivery and installation schedule allows 24 hours for the library to acclimate before installation.
Unpacking and Moving the Library on page 45	
☐	Floors to be traversed can handle the weight of the crated frames.
☐	Transportation equipment—forklift, pallet jack, and/or stair crawler—is available and can handle the weight of the crated frames.
☐	Doorways, stairwells, hallways, and elevators allow the size of the crated library without tilting.
☐	Elevators can handle the weight of the crated library.
☐	Space is available in the data center where the library is to be installed for the crates and crate ramp, with extra space for maneuvering.
☐	If the path, transportation equipment, or data center is not able to accommodate the crates, contact Spectra Logic Professional Services in advance of the installation date. See Contacting Spectra Logic on page 8.