



# Sun™ Cooling Door 5600 Installation Guide

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Sun Microsystems, Inc.  
[www.sun.com](http://www.sun.com)

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# Introduction

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The Sun Cooling Door 5600 is a 35kW cooling system for high-density heat loads that mounts on the rear of a Sun product and allows access to the back of the server rack or chassis.

Room air is drawn in through the front of the rack, picks up heat from the servers, transfers the heat to the Sun Cooling Door 5600's coil and is expelled through the rear of the rack or chassis. When entering air temperature is 77°F (25°C) or fewer, the Sun Cooling Door 5600 removes up to 35kW of heat generated by the components without raising the temperature of the air leaving the rack or chassis.

The Sun Cooling Door 5600 is a passive system and requires no electricity. It relies on the server fans to move air across the micro-channel coil. Captured heat is carried away through Liebert XD pumped refrigerant technology.

Pumped R-134a refrigerant is supplied by either a Liebert XDP™ or Liebert XDC™. Either Liebert unit will support up to four Sun Cooling Door 5600 units. Room cooling must be provided by a computer room air conditioner. For further information, refer to the Liebert XD System Design Manual, Liebert XDP User Manual or the Liebert XDC User Manual, available in the product pages at the Liebert web site:

<http://www.liebert.com>

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## 1.1 Product / System Description

Each Sun Cooling Door 5600, when attached to a fully loaded Sun rack or chassis, has a nominal cooling capacity of 35kW (10 tons; 120,000 BTUh).

The complete system consists of Sun Cooling Door 5600 modules, piping, and a Liebert XDP or Liebert XDC.



## Preparing for Installation

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Upon arrival of the unit, and before unpacking it, verify that the labeled equipment matches the bill of lading. Inspect all items for visible and concealed damage. Damage should be immediately reported to the carrier and a damage claim filed with a copy sent to Sun or to your sales representative. If concealed damage is found later, report it to the shipping company and your local Sun representative.

Check to be sure all required assemblies and parts have been received by comparing the delivered items to the shipping manifest.

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**Note** – If the Sun product has an existing door, see [Appendix A, Removing an Existing Door](#).

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### 2.1 Unit Handling



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**Caution** – Risk of sharp edges, splinters, and exposed fasteners. Can cause personal injury. Only properly trained and qualified Liebert personnel wearing appropriate headgear, gloves, shoes, and glasses should attempt to move, lift, unpack, or prepare the unit for installation.

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**Caution** – Risk of handling a 130 lb (59kg) unit. Improper lifting can cause personal injury and equipment damage. A minimum of two properly trained and qualified are required to lift or move the Sun Cooling Door 5600. The Sun Cooling Door 5600 should only be installed by properly trained and qualified Liebert associates.

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When unpacking and handling the unit, exercise extra care to prevent damage.

Sun recommends using a forklift or pallet jack to move the Sun Cooling Door 5600 while it is packaged. If multiple Sun Cooling Door 5600 units are delivered, they will be shipped on a pallet with up to four units. A pallet jack will be required to move these units to the installation location.

- If using a forklift or pallet jack, ensure that the fork tine length is suitable to safely move the packaged unit.
- Sun recommends keeping the unit in the protective packaging until it has been moved to the installation site.
- When handling and unpacking the unit, exercise great care to prevent damage.
- Do not lift the unit any higher than 6" (152mm) while moving it. If it must be lifted higher than 6" (152mm), exercise great care and keep all personnel who are not helping move the unit at least 20 feet (5m) away from the unit.
- Do not use unit piping to lift or move the Sun Cooling Door 5600.

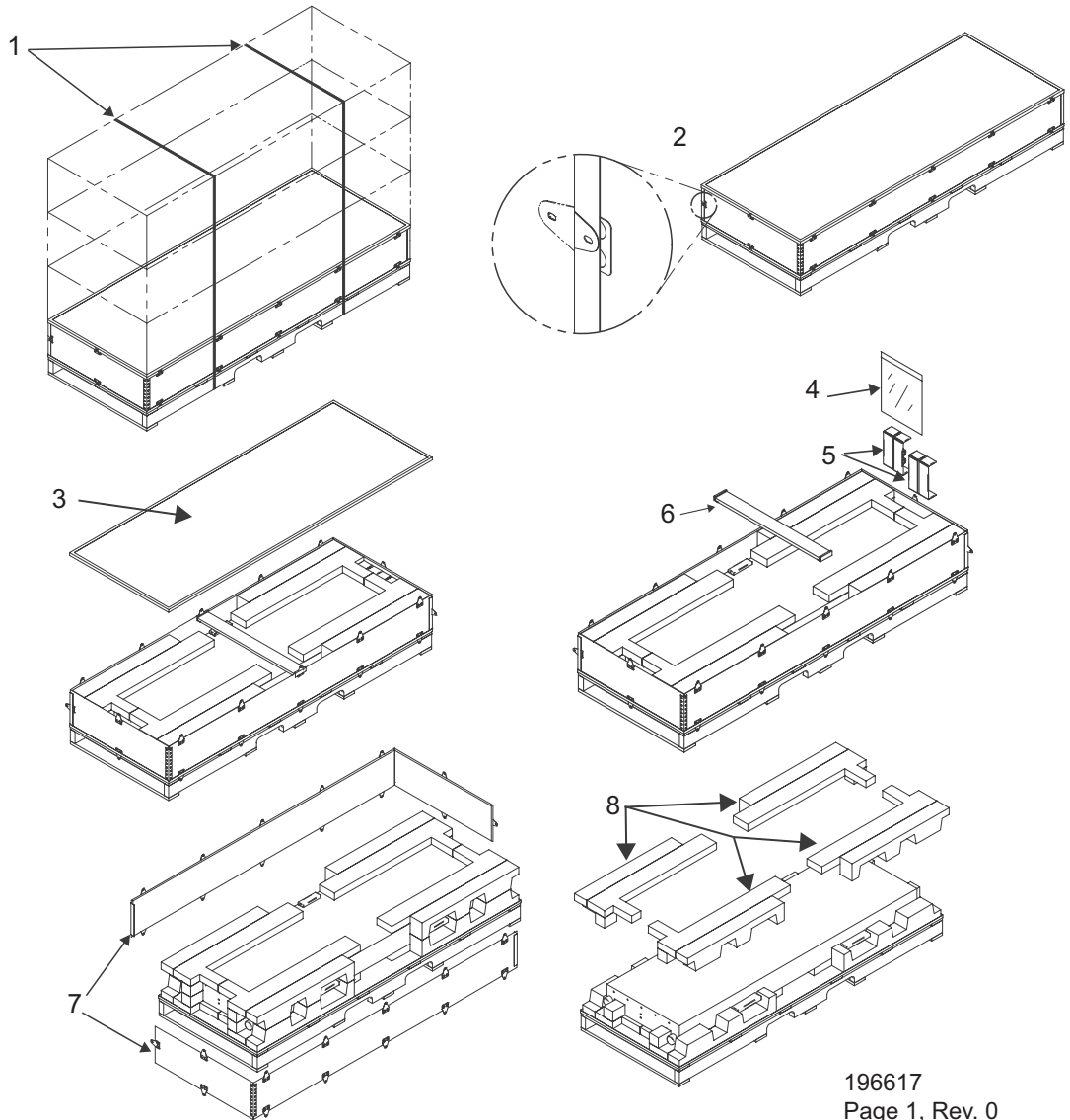
## 2.1.1 Unpacking the Sun Cooling Door 5600

Do not unpack the Sun Cooling Door 5600 units before moving them to their installation location. Refer to [FIGURE 2-1](#) for the steps below. Once at the installation point:

1. **Cut the banding and place all packaged Sun Cooling Door 5600s on the floor for unpacking.**
2. **Straighten all metal tabs as shown in [FIGURE 2-1](#).**  
Sun recommends using any of these tools to straighten the tabs: flat-blade screwdriver, claw hammer, pliers or crowbar.
3. **Remove the top cover from the package.**
4. **Remove and set aside the hardware and key package.**
5. **Remove and set aside the Supply/Return kits from the end of package.**
6. **Remove the center top brace.**
7. **Remove the side panels from the package.**
8. **Remove the top protective foam from the package.**
9. **Cut the bag to permit removing the Sun Cooling Door 5600.**
10. **A two-person crew of properly trained and qualified Liebert personnel can now lift the Sun Cooling Door 5600 from the package and install it (see [FIGURE 2-2](#)).**

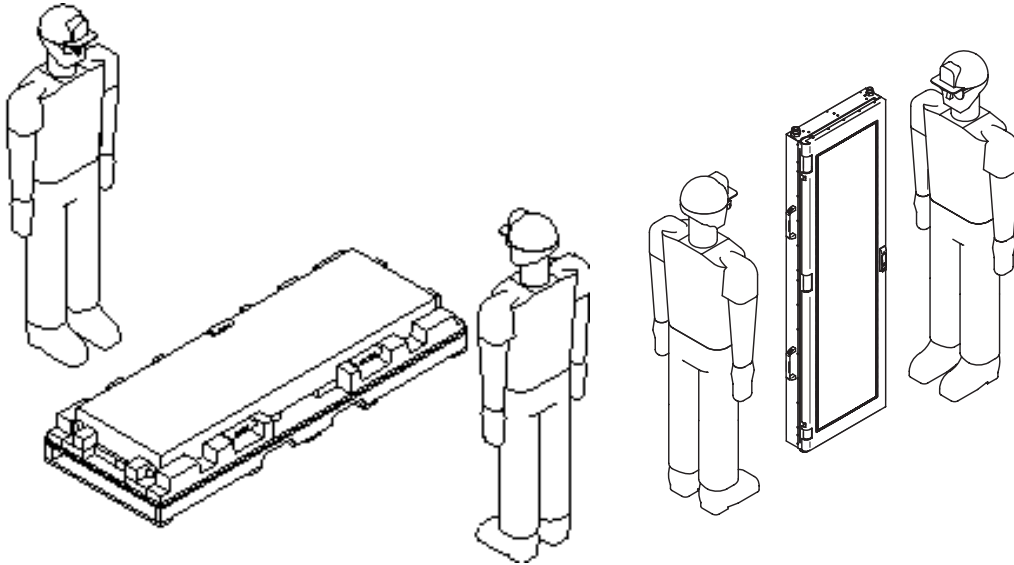


**FIGURE 2-1** Uncrating the Sun Cooling Door 5600



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Page 1, Rev. 0

**FIGURE 2-2** Remove Sun Cooling Door 5600 from Package



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**Caution** – Risk of 130 lb (59 Kg) unit falling over. Can cause personal injury or property damage. Do not leave a Sun Cooling Door 5600 standing unattended on its side or its end without adequate support to prevent it from falling over. The Sun Cooling Door 5600 must be supported at all times or laid flat on protective material until it is installed.

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## Installation

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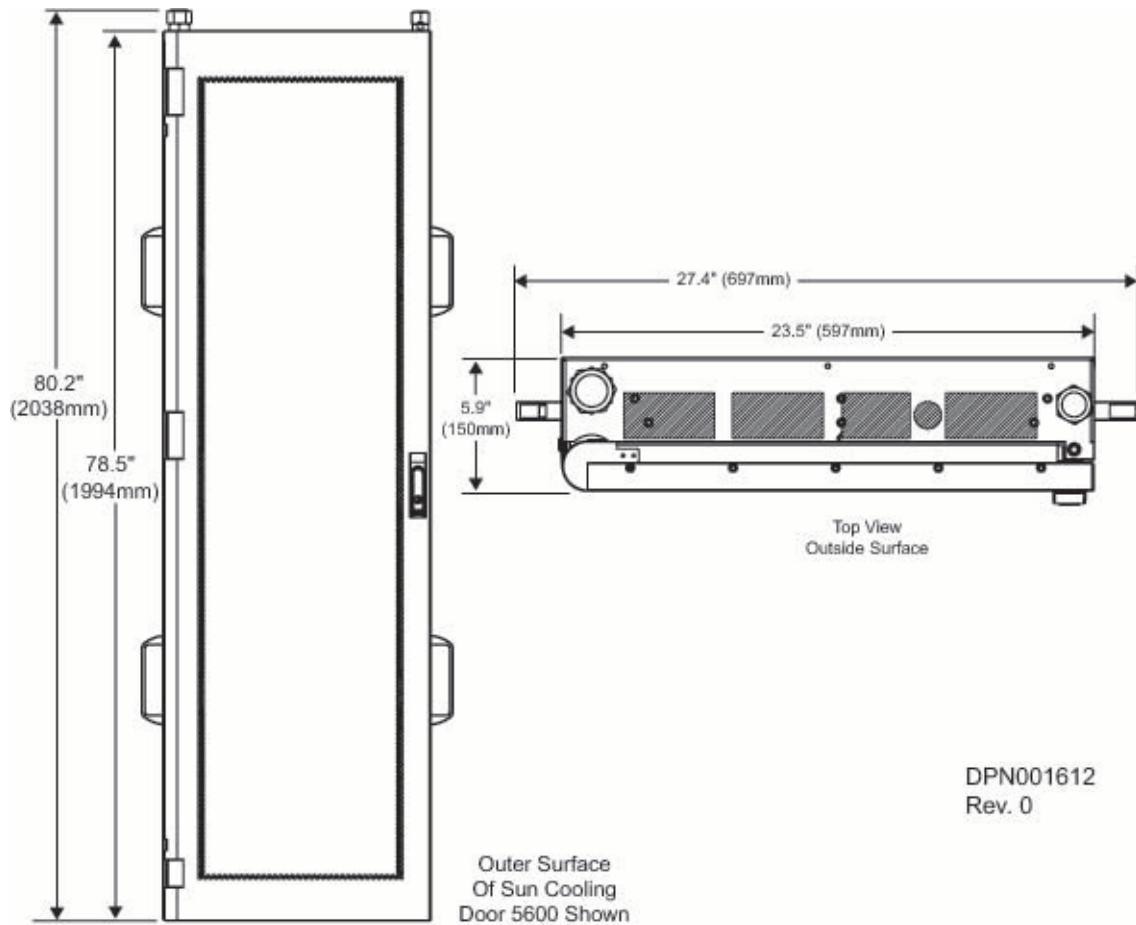
Sun Cooling Door 5600 modules must be securely mounted on the rear of the Sun cabinet. No cutting or drilling is required to attach the modules; all mounting features required are fabricated at the factory.

The module's dimensions are listed in [TABLE 3-1](#) and shown in [FIGURE 3-1](#).

**TABLE 3-1** Sun Cooling Door 5600 Dimensions

<b>Dimension</b>	<b>Measurement</b>
Height (without hardware)	78.5 inches (1994 mm)
Height (with hardware)	80.2 inches (2038 mm)
Width (without hardware)	23.5 inches (597 mm)
Width (with hardware)	27.4 inches (697 mm)
Depth	5.9 inches (150 mm)

**FIGURE 3-1** Sun Cooling Door 5600 Dimensions



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## 3.1 European Union Fluorinated Greenhouse Gas Requirements

Stationary air conditioning, refrigeration, heat pump equipment and stationary fire protection systems in the European Community market and operating with fluorinated greenhouse gases (f-gas), such as R407C, R134a, R410A, must comply with the F-Gas Regulation: (EC) No. 842/2006 (F-gas). The regulation prohibits, among other actions, venting fluorinated greenhouse gases to the atmosphere.

The F-Gas Regulation requires operators to use all measures that are technically feasible and do not entail disproportionate cost to prevent leakage of these gases, to test for leakage regularly and to recover f-gas as part of regular, scheduled maintenance or decommission.

Refer to the full regulation for additional details.

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**Note** – Only properly trained and qualified personnel should service, charge or repair the system.

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## 3.2 Mounting the Sun Cooling Door 5600 on a Sun Rack or Chassis

The Sun Cooling Door 5600 module mounts on the rear of a Sun rack or chassis with 14 M6 x 12mm bolts that secure the Sun Cooling Door 5600's frame to the rack or chassis. This operation will require two persons to lift the Sun Cooling Door 5600 and hang it on bolt heads on the Sun rack or chassis.

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**Note** – Risk of improper installation. Can cause equipment damage. The Sun Cooling Door 5600 must be installed by properly trained and qualified Liebert service personnel.

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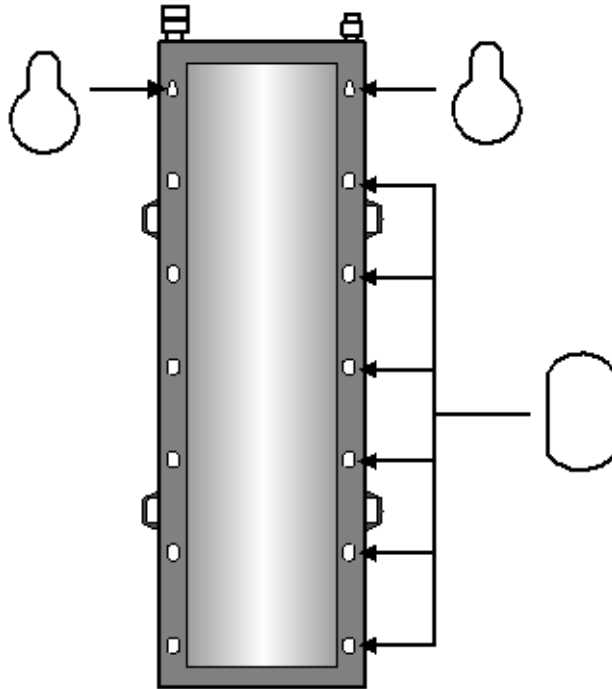
Before beginning to attach the Sun Cooling Door 5600 module on the Sun rack or chassis, remove the rear door from the rack or chassis. Refer to [Appendix A](#) for details.

1. Find the M6 x 12mm bolts that were shipped with the Sun Cooling Door 5600 and insert one in the top hole on each side of the rack.
2. Tighten the two bolts with a 10mm wrench, leaving enough space between the bolts' flanged head to accept the thickness of the Sun Cooling Door 5600's frame (2-3mm).
3. Lift the Sun Cooling Door 5600 by the handles on the side, match the keyhole slots to the bolts in the Sun rack or chassis and hang the Sun Cooling Door 5600 on the protruding bolt heads.
4. Insert the remaining bolts and tighten snugly with a 10mm wrench.
5. Tighten the bolts in the keyhole slots snugly with a 10mm wrench.

**6. Remove the four handles (two on each side).**

Each is attached with two socket head bolts with 6mm Allen key heads. Use a 6mm Allen wrench to remove the handles; store the handles for use in case the Sun Cooling Door 5600 must be removed from the Sun rack or chassis.

**FIGURE 3-2** Mounting Hole Locations on Sun Cooling Door 5600's Inner Surface—Seven on Each Side



### 3.2.1 Refrigerant Connection Methods and Points

The piping assembly and connection means used for piping in the Sun Cooling Door 5600 system are similar to those used in conventional refrigeration systems. Observe all standard practices during installation and startup to prevent damage and contamination.

The Sun Cooling Door 5600 has supply and return connection points on the top of each module. The supply piping connection is 1/2" outside diameter copper pipe, and the return connection is 5/8" outside diameter copper pipe. The supply fitting is equipped with a Schrader valve. The door contains a shipping charge of dry nitrogen that should be purged before installation.

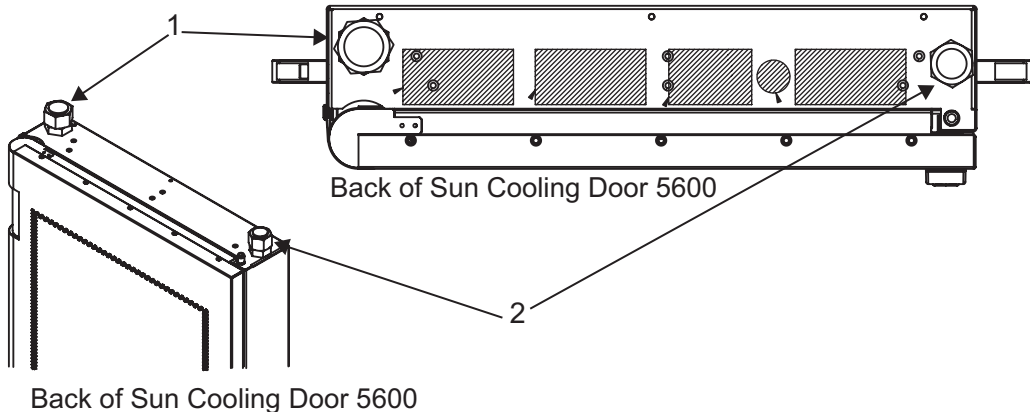
### 3.2.1.1 Attaching F-Pipe Fittings

1. Remove the cap from each Schrader valve on the Sun Cooling Door 5600 module and vent the shipping charge of nitrogen gas.
2. Find and open the bag containing the supply and return connectors that were shipped with the Sun Cooling Door 5600.
3. Attach the supply and the return connectors to the top of the Sun Cooling Door 5600. Position the connectors so that they do not interfere with rack use.

The supply fitting connection is 7/8" outside diameter copper pipe, and return fitting connection is 1-1/4" outside diameter copper. The supply fitting attaches to the right side of the Sun Cooling Door 5600 when viewed from behind and the return fitting attaches to the left side (refer to [FIGURE 3-3](#)).

Use the wrenches and torques specified in [TABLE 3-2](#).

**FIGURE 3-3** Refrigerant Supply and Return Attachment Locations



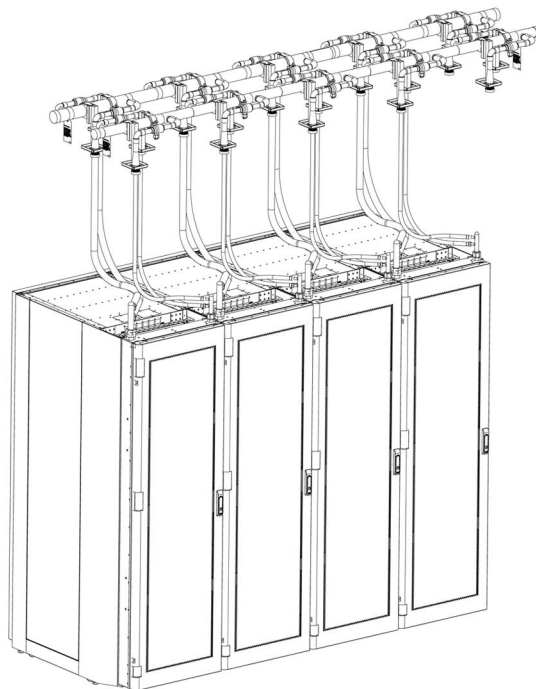
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## 3.3 Connecting Liebert XD Flex Pipes to the Sun Cooling Door 5600

The Sun Cooling Door 5600 module system requires using the Liebert XD prefabricated piping assembly. The prefabricated piping is compatible with the Liebert XD Flex Pipe, which is also required to use Sun Cooling Door 5600 modules. For information, refer to the Liebert XD manuals, which can be found on Liebert's web site:

<http://www.liebert.com>

**FIGURE 3-4** Sun Cooling Door 5600 with Liebert XD Flex Hose Attached to Refrigerant Supply and Return Pipes



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**Caution** – Risk of explosive discharge of pressurized refrigerant. This can cause personal injury. Do not disconnect one-shot refrigerant connections after they have been connected. Disconnection will release pressurized R-134a refrigerant from the Sun Cooling Door 5600.

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1. Remove the caps on the supply and return lines on the top of the Sun Cooling Door 5600.
2. Lubricate the threads, diaphragm and O-ring with one or two drops of mineral oil, taking care to minimize oil on surfaces that will be exposed to refrigerant.
3. Connect the line-set coupling finger-tight.
4. Make sure the Schrader valve is properly oriented; refer to the label on the top of the Sun Cooling Door 5600.
5. Hold the backup hex nut with a wrench while tightening the swivel nut.
6. Tighten the swivel nut on the female coupling until it is seated or a definite resistance is felt.



7. Once a definite bottoming resistance is felt (as in metal to metal), place a mark lengthwise from the swivel nut to the backup hex with an etching tool or other marker and tighten the swivel nut on the female coupling an additional 1/4 turn.
8. Tighten the 7/8" supply fittings to 94lb-ft.
9. Tighten the 1-1/4return fittings to 150lb-ft.
10. Mark the female and male coupler with an etching tool or other marker for future reference.

### 3.3.1 Header System

The Sun Cooling Door 5600 module system with optional flexible piping requires use of the Liebert XD prefabricated piping assembly. The prefabricated piping is compatible with the Liebert XD Flex Pipe required to attach to the Sun Cooling Door 5600 modules.

For additional information, refer to the Liebert X-treme Density System Design Manual, SL-16655, available at the Liebert web site:

<http://www.liebert.com>

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## 3.4 Connecting a Sun Cooling Door 5600 to an Operational Liebert XD System

This operation requires two properly trained and qualified Liebert service personnel.

Before connecting the Sun Cooling Door 5600 with Liebert XD Flex Pipe to the prefabricated piping mains, check the entire system for leaks.

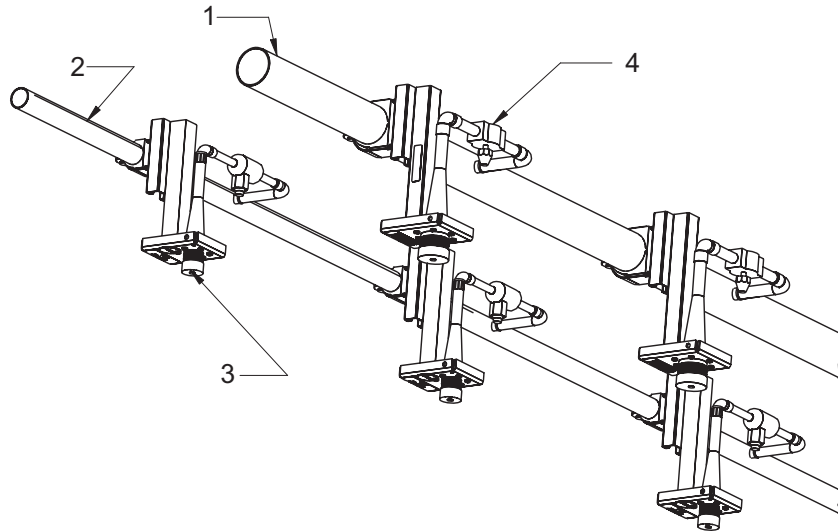
Check the holding charge in the Sun Cooling Door 5600 to ensure that the unit has no leaks.

Read all instructions before beginning installation.

### Tools Required

- Torque wrench, 1/2" drive, capable of 150lb-ft.
  - Adjustable wrench with a maximum adjustment size of 2" (51mm)
  - Screwdriver, Phillips or blade type
1. **Determine the port locations on the two supply and two return lines overhead.**
  2. **Make sure the service valve for each port is closed.**
  3. **Remove cap for only the required ports. Do not remove caps from the unused ports.**
  4. **Once [Step 3](#) has been completed, remove the pipe plugs that are supplied on the Liebert XD Flex Pipe.**
  5. **Use system refrigerant to lubricate the face of the male coupling half, including the poppet valve face and the stainless steel delta ring.**

**FIGURE 3-5** Liebert XD Prefabricated Piping Assembly



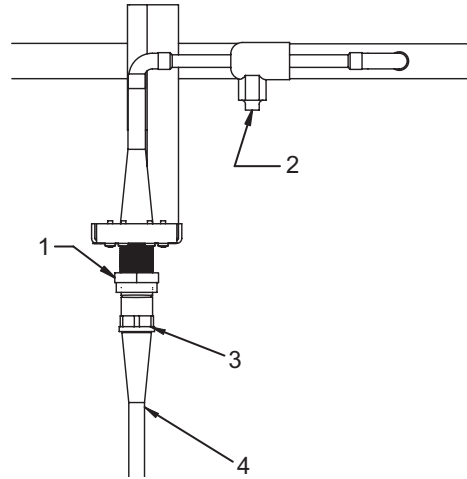
**Figure Legend**

- 
- |   |                                   |
|---|-----------------------------------|
| 1 | Return Main                       |
| 2 | Supply Main                       |
| 3 | Threaded Cap (typical)            |
| 4 | Service Valve, Typical, all ports |
- 

**Notice** - Risk of overtightening of couplers. Can cause equipment damage. See [FIGURE 3-6](#) and the related [Figure Legend](#) for correct coupler tightening specifications.

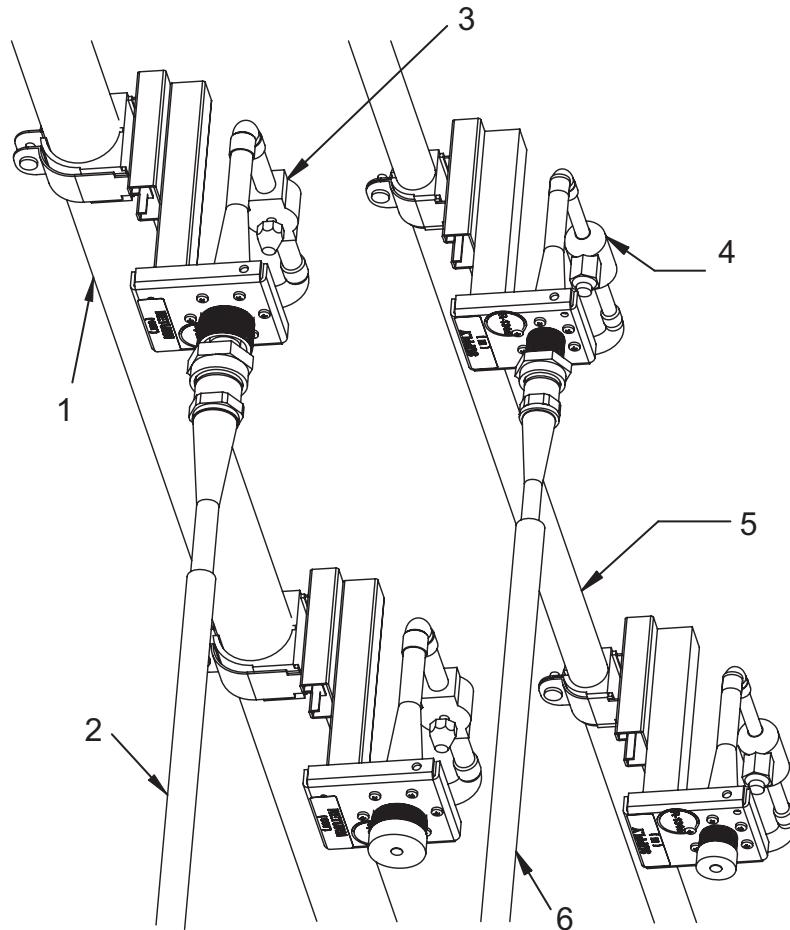
6. Thread the return couplers together. The return couplers are the larger of the couplers.
7. Use the adjustable wrench to hold the fixed side of the female coupler on the Sun Cooling Door 5600 stationary. Use the torque wrench to tighten the collar onto the coupler to the values below.
  - Supply fittings: 22.1-25.8 lb-ft (30-35Nm)
  - Return fittings: 59-62.7 lb-ft (74-88Nm)
8. Mark the female and male coupler with an etching tool or other marker for future reference.

**FIGURE 3-6** Detail View of Liebert XD Flex Pipe and Prefabricated Piping Port



9. Repeat [Step 6](#) and [Step 7](#) for the smaller couplers (supply line).
10. Once the supply and return connections are completed, open the return service valves, then open the supply service valves.

**FIGURE 3-7** Sun Cooling Door 5600 Piping System with Prefabricated Piping Assembly and Liebert XD Flex Pipe



**Figure Legend**

- 
- 1 Return Main
  - 2 Return Liebert Flex Pipe
  - 3 Return Service Valve (After system leak check, make sure valve is open)
  - 4 Supply Service Valve (After system leak check, make sure valve is open)
  - 5 Supply Main
  - 6 Supply Liebert Flex Pipe
-

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## 3.5 Disconnecting a Sun Cooling Door 5600 from a Liebert XD System



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**Caution** – Risk of handling a 130 lb (59kg) unit. Improper lifting can cause personal injury and equipment damage. A minimum of two properly trained and qualified are required to lift or move the Sun Cooling Door 5600. The Sun Cooling Door 5600 should only be installed by properly trained and qualified Liebert associates.

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**Caution** – Risk of explosive discharge of pressurized refrigerant. Can cause personal injury or equipment damage. Relieve refrigerant system pressure before attempting to disconnect piping connections or removing the door. Reclaim all refrigerant per local codes.

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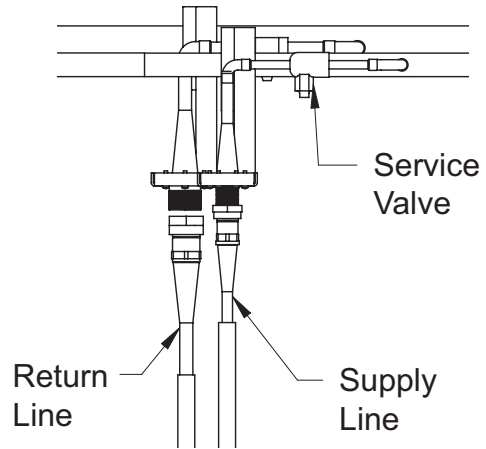
Before uninstalling a Sun Cooling Door 5600 with Liebert Flex Pipe from the prefabricated piping mains, close the supply service valve, wait approximately two minutes and then close the return service valve.

Read all instructions before beginning.

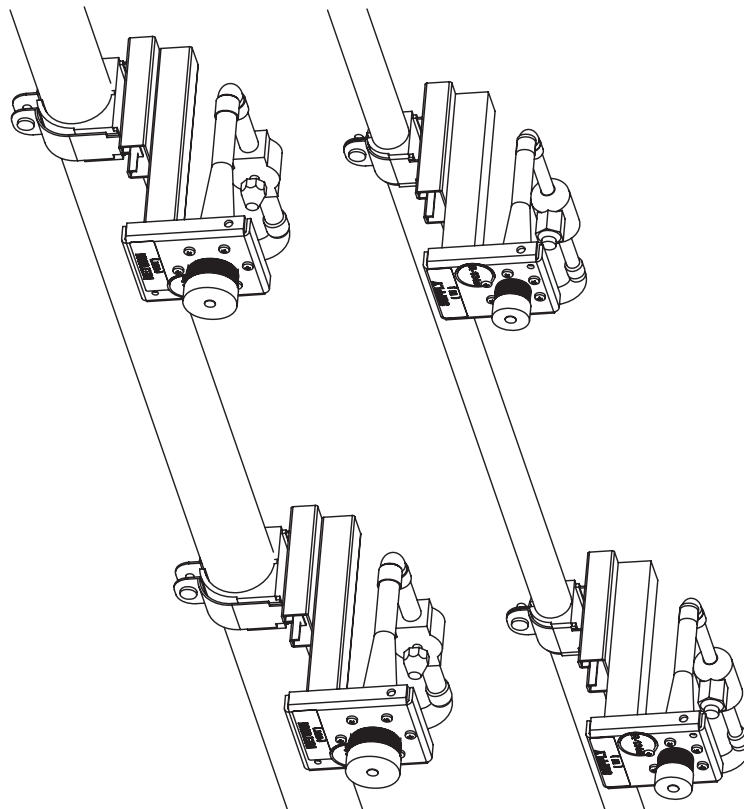
### Tools Required

- Two adjustable wrenches, maximum adjustment size of 2-1/2 inches
  - Phillips head #2 screwdriver
1. Close the service valves in the supply line to the Sun Cooling Door 5600 (smaller couplers).
  2. Close the service valves in the return lines to the Sun Cooling Door 5600 (larger couplers).
  3. Locate and have ready the caps and plugs for both ends of the supply and return couplers.
  4. Loosen the female supply couplers from the male supply couplers (smaller couplers). This requires two adjustable wrenches. Refer to [FIGURE 3-6](#).
  5. The Sun Cooling Door 5600 side of the female couplers must be held stationary while the collars on the couplers are being loosened. Refer to [FIGURE 3-6](#).
  6. Disconnect the couplers.

**FIGURE 3-8** Profile View of the Sun Cooling Door 5600 Piping System



**FIGURE 3-9** Piping Mains Without Sun Cooling Door 5600 or Liebert XD Flex Pipe



7. Place the protective dust cap and plug back onto both ends of the couplers on the Sun Cooling Door 5600 and the port pipe.
8. Repeat [Step 5](#) through [Step 7](#) for the return couplers (larger couplers).
9. Carefully lay the Liebert XD Flex Pipe aside.

**Notice** - The Liebert XD Flex Pipe might kink if improperly handled. This can cause permanent damage to the pipe.



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## 3.6 Checklist for Proper Installation

- Sun Cooling Door 5600 modules are securely attached to the cabinet.
- Refrigerant supply and return connectors are properly attached to the Sun Cooling Door 5600.
- Handles are removed from Sun Cooling Door 5600 and stored properly.



## Maintenance

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Minimal maintenance is required to keep the Sun Cooling Door 5600 operating at optimal levels. The unit should be cleaned and checked for damage. Suggested maintenance includes:

- Cooling fins—Clean any dust and debris from the cooling fins, taking care not to bend them.

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### 4.1 Fluorinated Greenhouse Gas Requirements

Stationary air conditioning, refrigeration, heat pump equipment and stationary fire protection systems in the European Community market and operating with fluorinated greenhouse gases (f-gas), such as R407C, R134a, R410A, must comply with the F-Gas Regulation: (EC) No. 842/2006 (F-gas). The regulation prohibits, among other actions, venting fluorinated greenhouse gases to the atmosphere.

The F-Gas Regulation requires operators to use all measures that are technically feasible and do not entail disproportionate cost to prevent leakage of these gases, to test for leakage regularly and to recover f-gas during equipment service and maintenance and before disposing of equipment.

Refer to the full regulation for additional details.



## Removing an Existing Door

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To install the Sun Cooling Door 5600, you first need to remove the existing door that is installed with the rack or chassis.

### ▼ To Remove the Rear Door on the Sun Blade 6048 Modular System Chassis

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**Note** – The Sun Cooling Door 5600 does not fit on the early Sun Blade 6048 chassis. It fits on the newer Sun Blade 6048 chassis (manufacturing part number 594-5971-01). You can distinguish the newer Sun Blade 6048 chassis by looking for the rear top and bottom cover for greater air flow control.

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**1. If necessary, unlock the rear door and open.**

Locate the door keys that were shipped with the rack and unlock the rear door.

**2. Detach the grounding straps connected to the door.**

Press down on the tabs on the grounding strap's quick-release connectors. Pull the straps away from the frame.

**3. Lift the door up and off of its hinges. See [FIGURE A-1](#).**

**FIGURE A-1** Removing the Sun Blade 6048 Door

