TeraFrame™

TeraFrame™ Cabinet System User's Manual

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Preface

OVERVIEW

To easily navigate within this PDF document, use the bookmarks located to the left of the screen, or click on the section titles located on the contents page. Additionally, Adobe Acrobat features a search tool for searching by keyword or part number.

This manual provides the information necessary to receive, unpack, and assemble the TeraFrame™ cabinet and some TeraFrame accessories and options. The information in this document is subject to change without notice. CPI is not liable for errors contained herein or for incidental or consequential damages in connection with the furnishing, performance, or use of this material.

Because of the dynamic nature and continued enhancement of CPI products, the illustrations and descriptions in this manual may differ from the various products you receive.

ORGANIZATION OF THIS MANUAL

This manual is organized as follows:

Chapter 1 includes pre-equipment-installation information such as:

- Introductory information
- Tools needed for assembly
- Moving the cabinet
- Handling and unpacking
- Standard cabinet parts
- Adjusting leveling feet
- Anchoring the cabinet
- Connecting the ground terminal block
- Accessories and options

Chapter 2 includes additional installation information such as:

- Installing on slab and access floors
- Removing the cabinet door
- Reversing the door swing
- Operating the door latches
- Removing side panels
- Bonding and grounding system
- Installing the top panel
- Baying cabinets
- Aligning radius drops, underfloor cable pathways, floor pass-throughs

Chapter 3 includes equipment installation information such as:

- Equipment mounting rails
- Cable management
- Vertical power managers
- Thermal management accessories
- Securing equipment to mounting rails
- Cable management: bundling, dressing, radius bend
- Environmental monitoring

CONVENTIONS USED IN THIS MANUAL

This manual provides general safety guidelines to be observed when planning for, installing, and operating your TeraFrame cabinet.

Special messages used throughout this manual are explained below:

WARNING: Text highlighted in this manner indicates that failure to follow directions in the warning could result in bodily harm or loss of life. Obey all safety messages that follow this symbol to avoid possible injury or death.

CAUTION: Text highlighted in this manner indicates that failure to follow instructions could result in damage to equipment or data.

IMPORTANT: Text set off in this manner presents clarifying information or specific instructions.

NOTE: Text set off in this manner presents commentary, sidelights, or interesting points of information.

SAFETY INFORMATION

Keep a printed copy of the Preface of this User's Manual, especially the following safety information, in or near the cabinet.

WARNINGS

- Improper use of this product may lead to serious injury or death. Read and understand all instructions for proper installation and use of this product.
- Be sure to use sufficient personnel to safely remove the cabinet from the pallet.
- Do not attempt to move large cabinets by yourself. Obtain adequate assistance to stabilize the cabinet during movement or hire professional equipment riggers.
- Move cabinets on installed casters with extreme care. Sudden stops, excessive force, and uneven surfaces may cause the cabinet to overturn. It is easier to move the cabinet with the back as the leading edge. Never push on the sides.
- Unload equipment from the cabinet before moving it.
- A standalone cabinet should be level, stable, and anchored to the floor. Two or more cabinets can be bayed together (coupled) to enhance their stability. Each cabinet should be anchored to the floor.
- Before loading equipment in the cabinet, be sure to adjust and lock the leveling feet to level the cabinet. Do not use casters to stabilize the cabinet; always anchor the leveling feet or the cabinet frame to the floor.
- Always load heavy equipment, such as a UPS, at the bottom of the cabinet first, and add lighter equipment on higher levels.
- There is a safety risk when equipment is mounted on a shelf installed more than 30 inches above the floor in a cabinet without doors and/or side panels. The equipment may accidentally slide or be accidentally pushed off the shelf and fall on personnel. When equipment is mounted on a shelf in this condition, securely fasten the equipment to the shelf or cabinet frame. The following accessories may be used to secure certain equipment on shelves: monitor tie-down kit (P/N 11725-X01), seismic equipment tie-down bracket (P/N 14061-X19), or equipment tie-down bracket (P/N 16356-X19).

- The TeraFrame cabinet can support many system configurations. The amount of force required to tip or make the cabinet unstable differs with each configuration. Be sure to read and follow your equipment manufacturer's specific assembly, installation, and safety instructions.
- When servicing slide-mounted equipment such as servers:
  - Secure all equipment, other than the unit being serviced, in position to prevent it from sliding out and destabilizing the cabinet.
  - Extend only one unit at a time. Extending multiple units may cause the cabinet to tip over.
  - Extend the unit slowly. Rapid deployment of the unit could cause the cabinet to tip over.
- For protection of the equipment and personnel, ground each cabinet individually to the Telecommunications Equipment Bonding Conductor (TEBC) or Signal Reference Structure (SRS).

CAUTIONS

- Doors must remain supported during repositioning so that the hinge components are not damaged. Use blocks or have an assistant support the edge of the door opposite the hinges. Do not allow the top hinge to support the entire weight of the door during repositioning.
- Before swinging the front door, confirm that both top and bottom hinge pins are in the correct cavities of the door frame member. Swinging the door while the hinges are positioned in the wrong cavity may damage the door and/or the hinge.
- Keep the rear door closed while removing the hinge pins. An open door will fall off the cabinet when the pins are removed. When remounting the door, be sure to reinsert the hinge pins. If the hinge pins are not reinserted, the door could fall off the next time it is opened.
- For optimal load bearing capacity, move the mounting rails back no more than 10 inches (250 mm) from the front or rear of the cabinet.

WARRANTY

Chatsworth Products, Inc. (CPI) guarantees manufactured products and each part or component thereof against all defects in material and/or workmanship. CPI agrees to remedy any manufacturing defect either through replacement or repair at no charge, provided that the defective unit is returned, transportation prepaid, to the CPI factory. The warranty extends for a period of one year from the date of installation or initial use, provided that this period shall not exceed 18 months from the original date of shipment from the factory.

Any product that has been repaired or replaced shall be similarly warranted on its repair or replacement for the remaining product warranty period or 90 days from the date of repair or replacement, whichever expires last.

This warranty does not extend to products that have been subjected to neglect, accident or improper use, nor to units that have been altered by non-CPI personnel.

No warranties other than those set forth in this section are given or implied with respect to the products furnished. CPI shall, in no event, be liable for consequential damages, for loss, damage or expense directly or indirectly arising from the use of the products, for any inability to use materials or from any other cause.

SERVICE AND SUPPORT

For answers to your questions, please email Technical Support at **techsupport@chatsworth.com**, or call toll-free at **800-834-4969** (US. & Canada) Monday to Friday, 5 a.m. to 5 p.m., Pacific Time.

INTENDED USE

Keep a printed copy of the Preface of this User's Manual in or near the cabinet.

- Install the cabinet only in a restricted service environment, such as a data center. Use indoors only, in environmentally controlled areas; do not use outdoors, in harsh environments, or in air-handling spaces.
- Use the cabinet for information technology and telecommunications equipment, including servers and peripherals.
- Allow only qualified service personnel to use the cabinet.
- Use casters only for moving empty cabinets to their final location. The cabinets must be anchored to the floor to ensure stability.
- The load-bearing capacity of the TeraFrame cabinet is:
  - 600 mm wide cabinet supports 2,500 lb (1134 kg)
  - 700 mm wide cabinet supports 2,000 lb (907.2 kg)
  - 800 mm wide cabinet supports 2,000 lb (907.2 kg)
- The ambient temperature operating range for the TeraFrame cabinet and installed cabinet accessories is 0° to 60°C (32° to 140°F).

FREQUENTLY ASKED QUESTIONS (FAQ)

Q: What cabinet sizes are available?
A: TeraFrame is customizable to include 12 heights (24U, 36U, and 42U to 51U); 17 depths (800 mm to 1200 mm); and 3 widths (600 mm, 700 mm, and 800 mm).

Q: What is the load-bearing capacity?
A: The load-bearing capacity (without casters) of the TeraFrame cabinet is:
- The 600mm wide cabinet supports 2,500 lb (1134 kg).
- The 700mm wide cabinet supports 2,000 lb (907.2 kg).
- The 800mm wide cabinet supports 2,000 lb (907.2 kg).

Q: Does the cabinet come with leveling feet?
A: Yes. They are factory-installed..

Q: Can the cabinet be bayed with other cabinets?
A: Yes. A baying kit is required. Each cabinet should be anchored to the floor.

Q: What accessories can be used with the TeraFrame?
A:

- Casters
- Combination lock
- Electronic door lock
- Top panel
- Baying kit
- Doors
- Power management options
- Cable management options
- Thermal management options
- Side panels
- Filler panels
- Shelves and trays

Q: What accessories cannot be used with the TeraFrame?
A:

- Non-TeraFrame vertical cable managers
- Non-TeraFrame casters
- Non-TeraFrame equipment mounting rails
- Half-height equipment mounting rails

Q: How much height do casters add to the TeraFrame cabinet?
A: Casters add 2.8 inches (71 mm) of height.

Q: What finishes are available for the TeraFrame cabinet?
A: Epoxy-polyester hybrid powder coat in Basic Black, Signature Blue, Glacier White, and Steel Gray.

Q: Does the TeraFrame cabinet come partially assembled like other Chatsworth cabinets?
A: No. The TeraFrame comes fully assembled with the exception of vertical exhaust ducts.

Q: Are there RMU marks on the equipment mounting rails?
A: Yes. There are RMU marks on all the TeraFrame equipment mounting rails: the punched square hole rails and the drilled and tapped rails.

Q: How do you attach equipment to the cabinet?
A: TeraFrame cabinet includes two pairs of adjustable depth equipment mounting rails. Equipment or shelves attach to the equipment mounting rails. Equipment mounting rails have 1-3/4 inch (44.45 mm) high rack-mount spaces (RMS, RMU, U). Mounting spaces are marked and numbered for easy placement of equipment. Mounting rails have square-punched or tapped mounting holes spaced according to the EIA-310D universal hole pattern. Square-punched rails accept cage nuts allowing you to quickly change the mounting hardware. Tapped rails are threaded for #12-24 screws. Use square-punched rails for server applications. Use tapped rails for network and cabling applications.

Q: How do you attach accessories (such as cable pathway products) to the top of the cabinet frame?
A: Use M8 drop-in nuts in the two upward-facing slide tracks at the top of the frame along with washers and M8 bolts to attach accessories to the top of the cabinet.

Q: Is the bottom of the cabinet open or closed?
A: The bottom of the cabinet is open.

Q: Is there a true "front" or "rear" to the TeraFrame cabinet?
A: No. Because the frame is symmetrical, the front of the cabinet is designated by the style of door and/or the location of the swivel casters (swivel casters are mounted in front).

Q: Can an external cable manager be attached to a standard TeraFrame cabinet?
A: No, the external cable manager is a T-Series SteelFrame cabinet accessory.

Q: When an air dam is installed, how can cables pass from the front to the rear of the cabinet?
A: Use a horizontal cable tray (rack-mount cable shelf, P/N 13517-701). See section 3.2.2.

Q: Are the doors reversible?
A: Yes, they are easily reversible. See section 2.3 for instructions. Before you load equipment into the cabinet, it is a good idea to decide which way you want the door to open. Reversing the doors requires access to the inside of the vertical rails of the frame.

Q: Can combination locks be reset?
A**:** Yes, as long as you know the existing combination. If unknown, you must use a key to gain access to the cabinet, or order a new lock.

Q: I did not find the answer to my question. Who do I contact for assistance?
A**:** Please email Technical Support at **techsupport@chatsworth.com**, or call toll-free at **800-834-4969** (US. & Canada) Monday to Friday, 5 a.m. to 5 p.m., Pacific Time.

Chapter 1. Getting Started

1.1 INTRODUCTION

The TeraFrame cabinet system is a unique computer storage system comprising a suite of comprehensive technology, including power and thermal management, access control, bonding and grounding, and remote monitoring. In addition, the TeraFrame cabinet mitigates risk by anticipating the emergence of future technology and evolving standards.

New features and unique qualities that distinguish the TeraFrame cabinet:

- Distinctive, high-tech front
- Integrated, consistent look to frame, doors, and accessories
- Average 10 degrees temperature reduction over major competitors' standalone perforated door products, resulting in doubling the equipment life and system uptime
- From 17% to over 3000% more internal cable management capacity than the industry average and from 131% to 544% more cable ingress capacity than the industry average
- An integrated cable management system that incorporates superior radius support and strain relief for cables
- Reversible doors that can open from the right or left
- Tamper-resistant door hinges
- Front-to-back slide tracks allow for easy repositioning of mounting rails and installation of accessories within the frame
- Serviceable parts fully accessible and serviceable in bayed, fully populated cabinet with side panels installed
- Integrated bonding and grounding system
- Upgraded heavy-duty casters

1.2 BEFORE YOU GET STARTED

Planning Tools

- Online CPI Product Configurator saves 25 percent planning time, with ordering errors reduced by 25 percent. To access: www.chatsworth.com/configurator

CPI's easy-to-use Product Configurator guides you through the steps and selections necessary to create the optimal TeraFrame configuration. This step-by-step process gives you detailed product information along with various options and accessories that can be added during the configuration process. Once the solution

has been configured, this confidential tool gives you a bill of materials (BOM), rendered drawings of the customized system, and a selection of distributors or global resellers. You can save multiple configured projects within the Product Configurator and can reaccess them at any time.

1.2.1 Tools needed for the cabinet and accessories

- Flat screwdriver
- Large Phillips screwdriver
- Small Phillips screwdriver
- 3/8 inch socket wrench
- 8 mm wrench
- 10 mm socket wrench
- 12 mm socket wrench
- 13 mm socket and open end wrench
- 16 mm open end wrench
- 17 mm open end wrench
- 5 mm hex key (Allen) wrench
- 3/16 inch hex key (Allen) wrench with 48 inch-pound torque wrench
- Pliers (to install cage nuts)

1.3 MOVING THE CABINET ON THE JOB SITE

1.3.1 Allotting space

The TeraFrame cabinet has 612 possible size configurations. Refer to TIA/EIA-942 standards for minimum spacing in the front and back for access, ventilation, and door swing.

Height: TeraFrame cabinet is available in twelve heights, without leveling feet:

U	24U	36U	42U	43U	44U	45U	46U	47U	48U	49U	50U	51U
Inch	46.8	67.8	78.3	80.0	81.8	83.5	85.3	87.0	88.8	90.5	92.3	94.0

Width: TeraFrame cabinet is available in three widths:

Metric (mm)	600	700	800
English (inch)	23.6*	27.6	31.5

* See section 2.9.3, Baying/spacer kit, for aligning 600 mm wide cabinets to 24 inch floor tiles.

Depth: TeraFrame cabinet has seventeen depth options, from 800 mm (31.5 inches) to 1200 mm (51.1 inches).

1.3.2 Load bearing capacity

The load-bearing capacity (without casters) of the TeraFrame cabinet is as follows:

- The 600 mm wide cabinet supports 2,500 lb.
- The 700 mm wide cabinet supports 2,000 lb.
- The 800 mm wide cabinet supports 2,000 lb.

NOTE: Casters are used only to move empty cabinets to their final location, where they must be bolted to the floor to ensure stability.

1.4 UNPACKING THE CABINET

1. Remove the outer packing material, consisting of stretch wrap that secures corrugated cardboard around the cabinet, and an inner plastic bag covering the cabinet. Remove the packaging carefully to avoid damage to the cabinet.
2. Check for damage. If any packaging or equipment damage is observed, immediately contact your distributor.
3. Check the packing list (in a plastic envelope fastened to the outside packaging) against all the components and assembly hardware (screws, nuts, and other fasteners).

1.4.1 Removing the cabinet from the pallet

WARNING: Be sure to use sufficient personnel to safely remove the cabinet from the pallet.

NOTE: To lighten the load to be moved, remove any doors and side panels before lifting the cabinet from the pallet.

1. Open the front and back doors to access bolts in each corner of the frame that hold the cabinet to the shipping pallet.
2. Remove the bolts (using a 3/8 inch socket) and wood shims from under the front and rear cabinet frame.
3. Remove the cabinet from the pallet.

1.5 INCLUDED WITH THE CABINET

Depending on your specifications, the TeraFrame cabinet may have the following features:

- Vertical frame with four vertical mounting rails – two front and two back
  - Square-punched rails for cage nuts, or
  - Tapped (threaded) hole rails for #12-24 screws

- Rail spacers for 700 mm wide and 800 mm wide cabinets
- Front door with perforated metal or Lexan panel
- Single rear door with solid or perforated metal panel or double rear door with perforated metal panels
- Door keys, two sets, that fit all cabinet locks
- Side panels
- Top panel
- Ground terminal block
- Hardware kit included with each cabinet
  - 4 leveling feet
  - Fasteners
- Additional accessories as selected using the online Product Configurator (www.chatsworth.com/configurator) at the time of purchase

NOTE: Floor anchor brackets and PDU mounting brackets can be purchased as accessories.

The TeraFrame cabinet is provided with hardware to secure equipment to the mounting rails. Cabinets shipped with tapped rails include 50 each #12-24x5/8 screws. Cabinets shipped with square-punched rails include 25 sets of M6 cage nuts and screws. Additional hardware is available for purchase under the following part numbers:

TAPPED RAIL HARDWARE KITS (SOLD SEPARATELY)				
PART NO.	NOMINAL SIZE	PACKAGE OF	FINISH	SHIPPING WEIGHT
40605-001	12-24	50	Clear Zinc	1 lb
40605-004	12-24	1,000	Clear Zinc	9 lb
40605-005	12-24	50	Black Zinc	1 lb
40605-006	12-24	1,000	Black Zinc	9 lb
SQUARE-PUNCHED RAIL HARDWARE KITS (SOLD SEPARATELY)				
PART NO.	NOMINAL SIZE	PACKAGE OF	FINISH	SHIPPING WEIGHT
12637-001	M-6	25 SETS	Gold Zinc	1 lb
12638-001	10-32	25 SETS	Clear Zinc	1 lb
12639-001	12-24	25 SETS	Black Zinc	1 lb

1.5.1 Adjusting leveling feet

Adjustable leveling feet, installed on every cabinet, provide stability, support the full weight of the cabinet, and compensate for uneven floors. Adjust the height of the leveling feet to level the cabinet. Secure the leveling feet by adjusting the top jam nut against the bottom of the frame.

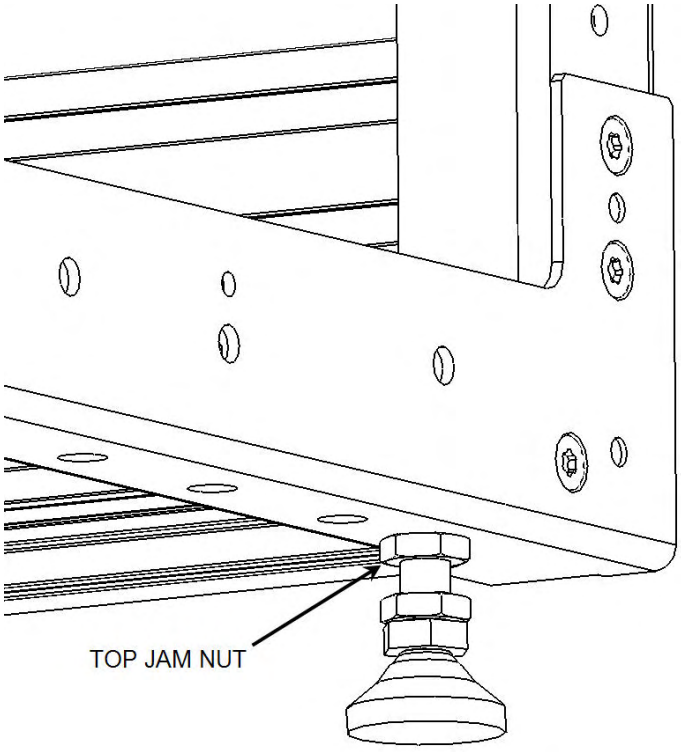


Fig. 1.5.1 Adjusting leveling feet

If leveling feet are used, CPI strongly recommends using floor anchors to clamp each leveling foot to the floor. See section 1.6.2 Anchoring the cabinet.

1.5.2 Connecting the ground terminal block

WARNING: For protection of the equipment and personnel, ground each cabinet individually to the Telecommunications Equipment Bonding Conductor (TEBC) or Signal Reference Structure (SRS).

A ground terminal block is factory installed at one of two locations provided on the cabinet frame. Section 2.8.1 provides instructions for positioning the terminal block in your desired location and attaching it to the ground conductor.

1.6 ACCESSORIES AND OPTIONS

A full range of accessories is available to complement and integrate with your TeraFrame cabinet. For more information, please contact your authorized CPI Distributor or CPI Customer Service Representative, or go to www.chatsworth.com. General accessories can be added to nearly all CPI structural support systems. These add-ons include power management, active components, and grounding and bonding accessories. All accessories are self-contained and include the installation hardware and instructions.

1.6.1 Front-to-back slide tracks

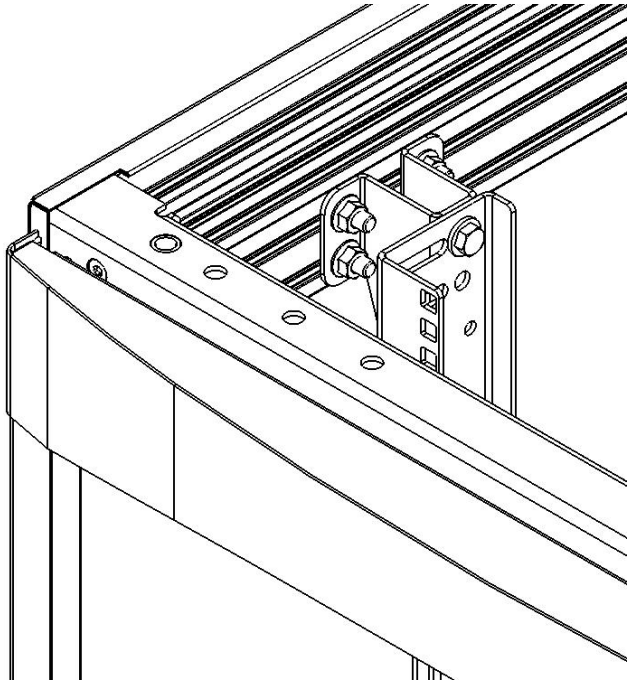


Fig. 1.6.1a Front-to-back slide tracks

Each of the four front-to-back frame members has four slide tracks that can be used to attach accessories. Upward-facing slide tracks allow vertical exhaust ducts and cable pathway products to be attached to the top of the cabinet. Inward-facing slide tracks allow for mounting rails and accessories to be attached inside the cabinet.

To use the slide tracks, place M8 drop-in nuts into the slide tracks as shown in the following figures. Use a screwdriver if needed to position the nut in the track.

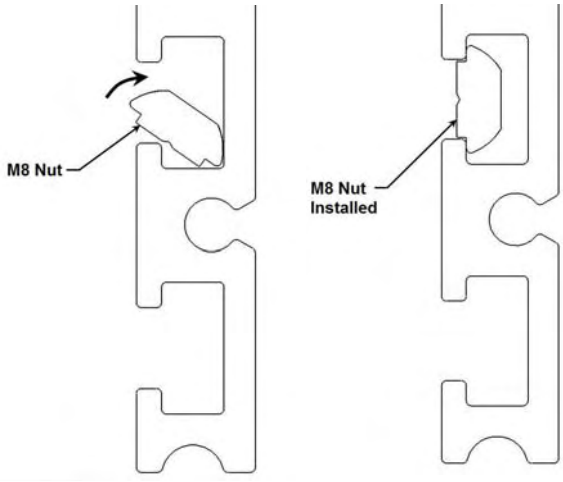


Fig. 1.6.1b Placing drop-in nuts in slide track

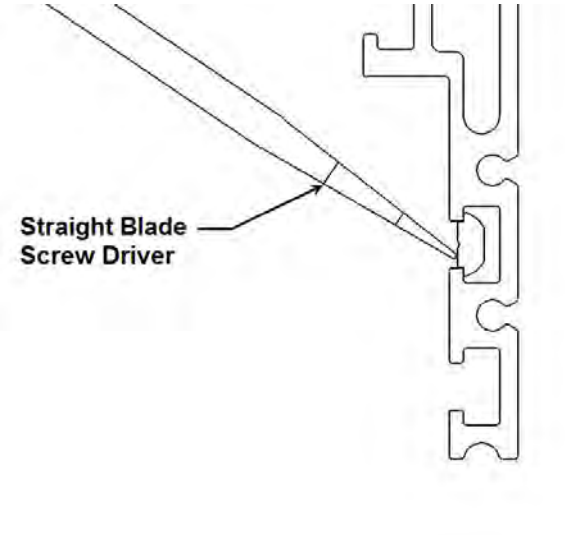


Fig. 1.6.1c Use screwdriver for placing drop-in nut in slide track

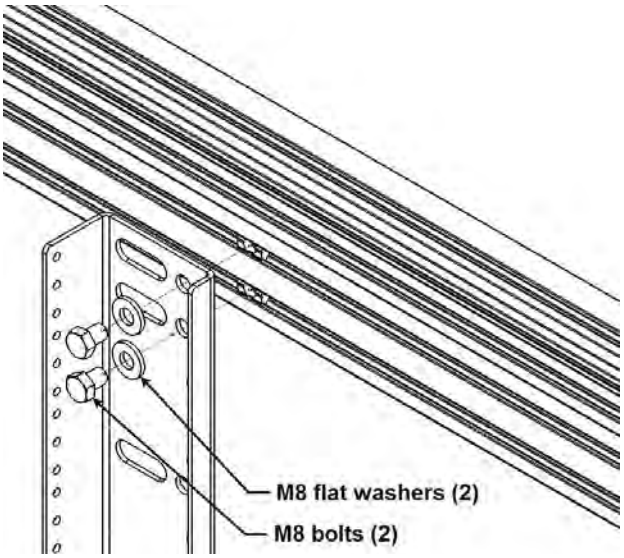


Fig. 1.6.1d Fastening M8 bolts to drop-in nuts

1.6.2 Anchoring the cabinet

Attach the cabinet to the access subfloor or to a slab floor. Bolt cabinets to the floor with or without leveling feet. Floor anchor brackets for leveling feet are included with each cabinet or can be purchased from CPI (P/N 34587-001).

TeraFrame cabinets, whether standalone or bayed together with other cabinets, must always be anchored to the floor. You can anchor the leveling feet on access floor and slab installations, or anchor the frame without leveling feet directly to the concrete slab.

1. Install the floor anchor brackets from inside the framework, capturing each of the four leveling feet.

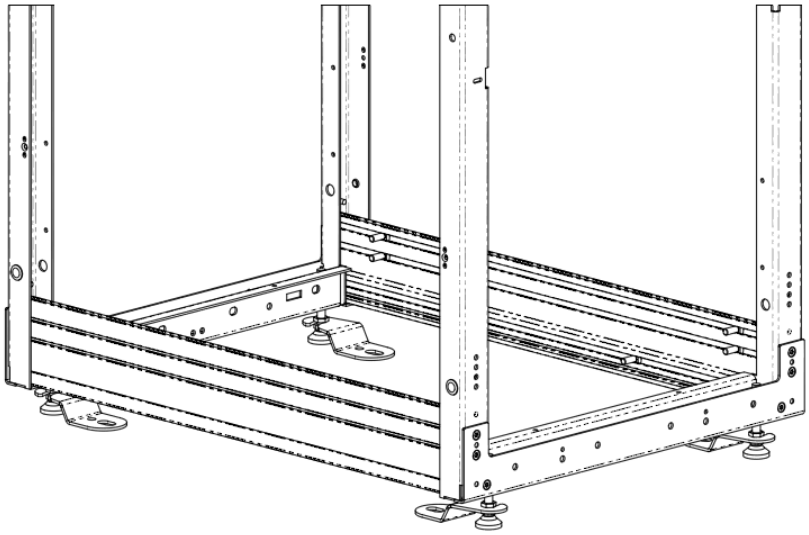


Fig. 1.6.2a Positioning floor anchor brackets

2. Attach to the floor with appropriate hardware for your type of floor.

3. Adjust the bottom jam nuts on the leveling feet down to secure the leveling feet to the floor anchor brackets.

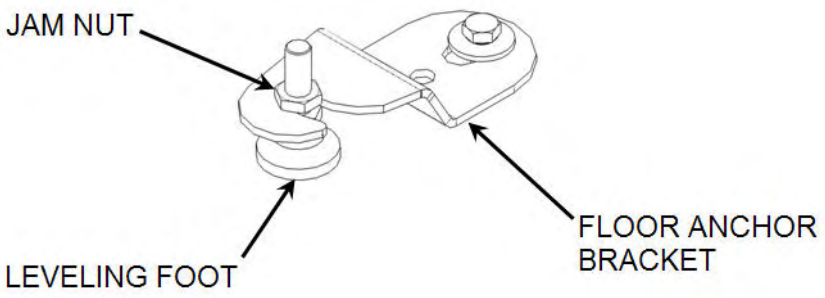


Fig. 1.6.2b Floor anchor brackets with leveling foot

4. If the cabinet does not have leveling feet, use four bolts to attach the cabinet frame directly to the floor.

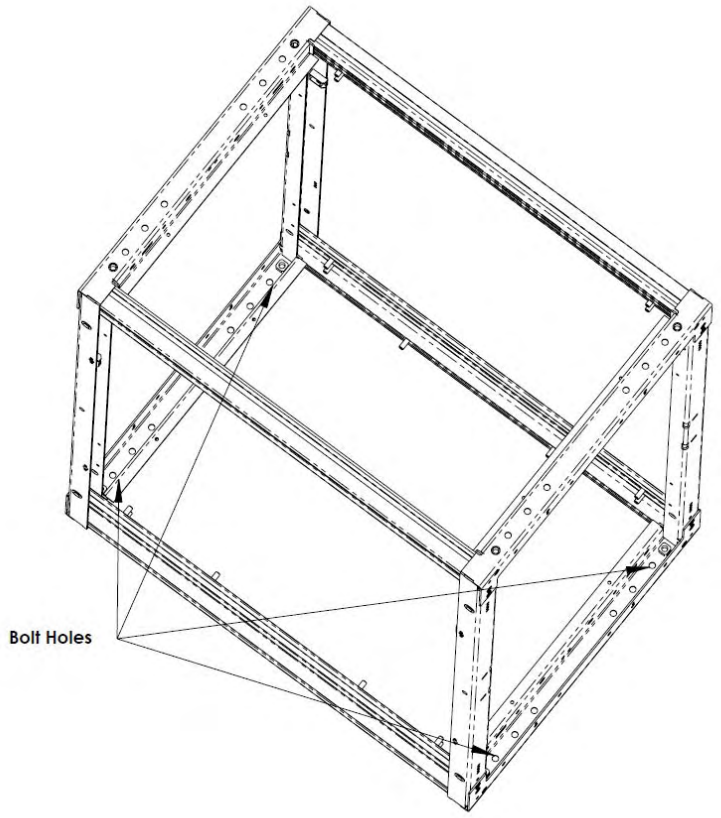


Fig. 1.6.2c Frame bolt down

1.6.3 Casters

Casters provide easy mobility, especially helpful in areas of limited space and for quick room reconfigurations. The caster kit (P/N 35051-C01) is intended for use only with the TeraFrame cabinet. Casters can be factory-installed on the cabinet/frame, or they can be purchased separately.

NOTE: Casters are intended for moving empty cabinets to their final location, where they must be bolted to the floor to ensure stability. Casters add 2.8 inches of height to the TeraFrame cabinet.

Features and benefits:

- 2 swivel casters for the front; 2 fixed casters for the back
- 3 inch diameter wheels, recessed under the cabinet to avoid tripping hazard

WARNING: Move cabinets on installed casters with extreme care. Sudden stops, excessive force, and uneven surfaces may cause the cabinet to overturn. It is easier to move the cabinet with the back as the leading edge. Never push on the sides.

To reduce the risk of personal injury or damage to the equipment, do not attempt to move large cabinets by yourself. Obtain adequate assistance to stabilize the cabinet during movement or hire professional equipment riggers.

Before loading equipment in the cabinet, be sure to adjust and lock the leveling feet to level the cabinet. Do not use casters to stabilize the cabinet; always bolt the leveling feet or the cabinet frame to the floor. Always load heavy equipment at the bottom of the cabinet first, and add lighter equipment to higher levels.

1.6.4 Doors

The TeraFrame cabinet has a single front door that is available in three panel styles: perforated metal, solid metal, or solid Lexan. The rear door is available as a single door with perforated metal panel, single door with solid metal panel, or double door with perforated metal panels. Doors can be factory-installed on the cabinet/frame, or they can be purchased separately.

The rear doors have hinges that allow them to open 180 degrees; however, when cabinets are bayed together, the doors can open only 175 degrees.

IMPORTANT: The hinge bolts must be accessible in order to reverse the door swing. If equipment mounting rails are positioned all the way forward in the cabinet, they may block access to the hinge bolts. Accordingly, if the mounting rails block access to the hinge bolts, decide which way you want the door to swing before equipment is loaded into the cabinet. Factory-installed doors are hung to swing open to the right when facing the cabinet.

See section 2.3 and 2.4 for instructions on removing, installing, and reversing the front and rear cabinet doors.

1.6.5 Top panel

The TeraFrame cabinet is available with two top panel styles. The "Server" style top panel option includes two brush cable ingresses for XXX Cat 6a cables. For cabinets deeper than 1025mm this panel also includes a knock-out region to accommodate a Vertical Exhaust Duct (VED)

A "Network" style top panel option is also available with four brush cable ingresses for XXX Cat 6a cables. Four grommets in the top panel also allow cable ingress into the cabinets.

The top panel can be factory-installed on the cabinet/frame, or it can be purchased separately. See section 2.7 Top panel installation, for instructions.

When planning the cable runways, be sure they align with top panel openings. See section 2.10, Aligning overhead cable pathways.

1.6.6 Baying kit

Multiple cabinets are bayed (joined) together to align cabinets, provide safety and stability, and eliminate spaces that could allow cool air and return air to mix. Cabinets must be the same height and depth. Two types of baying kits are available. For more information, go to www.chatsworth.com.

See section 2.9 Baying cabinets, for installation instructions.

1.6.7 Cable management

Cable management products create a pathway for data cables, patch cords, and power cords around and between the installed equipment. They also provide critical support for cable bundles. Defining cable pathways results in better cable organization, which means easier moves, additions, and changes of your connections. In addition, fewer tangles and smoother turns help you maintain the quality of your circuit and data transmission. Cable managers can be factory-installed in the cabinet/frame, or they can be purchased separately.

See section 2.10, Aligning overhead cable pathways; section 3.2, Adding/adjusting cable management; and section 3.6, Dressing cables.

1.6.8 Vertical power strip brackets

A vertical power cord manager allows you to attach vertical power strips to the TeraFrame cabinet and manage the power cord slack. They are available in all heights from 42U to 51U, and two widths: L-shaped, 2-1/2 inches wide (34581-Series) and C-shaped, 8 inches wide (34582-Series). The narrow manager can hold two power strips, and the wide manager can accommodate up to four power

strips. Vertical power cord managers can be factory-installed in the cabinet/frame, or they can be purchased separately.

A cost effective power strip mounting bracket solution is available for 42U and 45U TeraFrame cabinets (CPI PN?). Adapter brackets may be used for other height cabinets. For 24U and 36U cabinets, use horizontal power strips available from CPI (12816-Series). See section 3.3 Vertical power managers, for instructions.

1.6.9 Thermal management

The TeraFrame cabinet system provides a broad array of integrated thermal management accessories to eliminate hot air recirculation, ensure adequate availability of cold air to the equipment intake, and lower the temperature of the intake air.

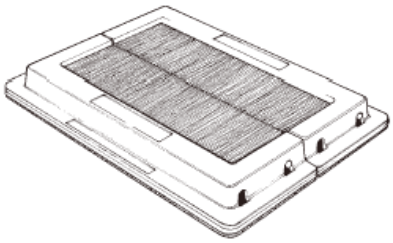
- An air dam blocks air recirculation.
- Integrated cold air distribution ducts convey cold air from the underfloor plenum directly to the front of equipment in the cabinet.
- Filler panels block hot air recirculation.
- CPI Koldlok floor sealing solutions eliminate bypass air flow.
- A foam gasket kit seals around the cabinet frame and floor.
- A Vertical Exhaust Duct (VED) to route heat into an overhead plenum.

Thermal management accessories can be factory-installed in the cabinet/frame, or they can be purchased separately. For additional information on thermal management accessories, see section 3.4, Adding/adjusting thermal management accessories.

1.6.9.1 Koldlok

The CPI Koldlok® raised floor grommet is a permanent, access floor, airflow sealing solution that lets you easily make cabling changes without requiring technician training or labor to cut, scribe, re-install, reposition, or modify any part of the Koldlok unit. The units are easy to install in the middle or along the edge of floor tiles.

The heavy-duty grommet contains overlapping, offset, multilayer, interwoven brushes that automatically reseal around cables, eliminating data center hot spots. A wide trim lip around the grommet, molded from high-impact-resistant polypropylene, provides a bumper to prevent equipment casters from falling through access floor openings and helps compensate for imprecise tile cutting.



The integral unit is designed specifically for installation in new data center access floor cable cutouts before equipment arrives or in existing sites during equipment moves.

The surface mount unit, which divides into two panels, installs above the floor over existing cable cutouts, without affecting live data center operations, for those situations where existing equipment can't be moved or unplugged.
Features and benefits:

- Eliminates the need for additional cooling units, saving capital.
- Improves reliability by decreasing risk of unscheduled downtime or random undiagnosed heat-related problems.
- Reduces or eliminates hot spots when used with other best practices.
- Increases efficiency of data center air cooling equipment.
- Dissipates static charge buildup to prevent electrostatic discharge (ESD).

For further information, see CPI Koldlok® Raised Floor Grommet at www.chatsworth.com/Koldlok.

1.6.9.2 Filler panels

Filler panels fill empty RMU spaces, thus providing for enhanced air flow, maintaining thermal integrity, and improving the functioning of hot aisle – cold aisle arrangements. See section 3.4.4, Installing snap-in filler panels.

1.6.9.3 Vertical Exhaust Duct System

The vertical exhaust duct system (VEDS) is available for 600mm and 700mm wide cabinets with depths of 1050mm up to 1200mm. The duct system must be used only with a solid metal rear door and either no front door or a perforated metal front door. The system includes a top panel, exhaust duct, an air flow director located at the inside bottom of the frame, and a rear door seal kit. The VEDS fully isolates return air from source air, thus eliminating any possible hot air recirculation in the data center. VEDS can be purchased with the cabinet/frame, or each component (vertical exhaust duct, top panel, airflow director and rear door

sealing kit) can be purchased separately. See section 3.4.5 for installation instructions.

Chapter 2. Installing the Cabinet

2.1 SLAB FLOOR INSTALLATION

Because TeraFrame™ is available in 3 widths and 17 depths; there are 51 possible dimension scenarios. The position of anchoring holes will vary depending on the size of the cabinet frame.

To use the actual cabinet as a "template" for anchoring holes, position the cabinet at its permanent location, mark the floor with the hole pattern for anchoring studs, move the cabinet aside, and drill the holes.

If leveling feet will be anchored, hook the anchors to the leveling feet, position the anchors inside the frame, and mark the holes to be drilled. You can also drill through the floor anchor slot without moving the cabinet.

See section 1.6.2, Anchoring the cabinet.

2.2 ACCESS FLOOR INSTALLATION – COLD AISLES

In a "hot aisle/cold aisle" installation, cold air is drawn into the front of a cabinet from perforated floor tiles and expelled into a hot aisle through the back of the cabinet. (See also the CPI White Paper, "Thermal Management in CPI Cabinet Systems." www.chatsworth.com/uploadedFiles/Files/thermal_mgmt_brochure.pdf) Cold air may also be routed from under the access floor directly into the cabinet. Position the cabinet on the access floor with the cold aisle in front of or underneath the cabinet, as desired. The effectiveness of the cold air delivered through the floor tiles can be boosted by an ECS blower (see section 3.4.1), air dams (see section 3.4.2), and air ducts (see section 3.4.3).

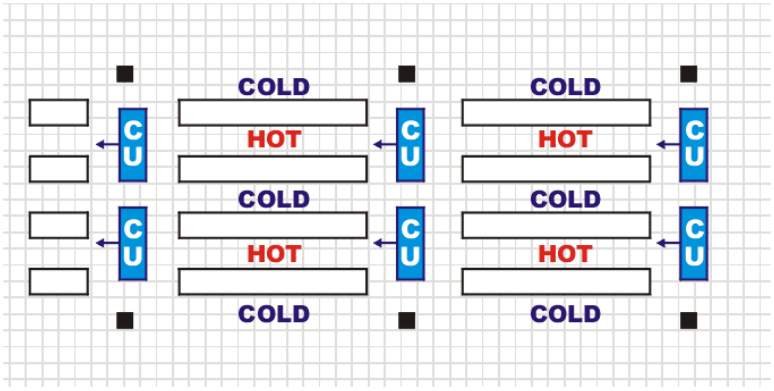


Fig. 2.2 Hot aisle/cold aisle layout

2.2.1 Bracing to the subfloor

In an access floor installation, ensure that the floor is strong enough to support the fully populated computer cabinets. Add subfloor bracing to provide the proper support for equipment.

Fig. 2.2.1 Subfloor bracing

2.2.2 Coordinating floor tile cuts for cable access

Plan the floor layout before installing the TeraFrame™ cabinet so that cable pass-through openings (cable cutouts) in the access floor will be correctly positioned and aligned. If both power and data cables are under the floor, it is advisable to provide separate ingress into the cabinet for the two types of cable.

The CPI Koldlok® raised floor grommets (P/N 13571-001, integral grommet, and P/N 13576-001, surface mount grommet) seal cable cutouts to prevent the loss of cold air and provide a protective edge around the opening to prevent cable damage. To minimize air loss from the access floor plenum, align under-floor cable pathways along the centerline of the brushes in the Koldlok unit and pass cables through the center of the brushes.

An impact-resistant polypropylene grommet insert protects cables as they pass through the opening in the floor tile, while a double-layer brush closure seals around cables and prevents cold air from escaping through the opening. Blocking airflow through cable cutouts can have significant impact on cooling effectiveness since more cold air is directed to equipment where it is needed. A surface-mount grommet that covers existing cable cutouts is also available.

Align the front of the cabinet with the floor tile. Determine the best orientation of the grommet over the cable cutout. Determine whether the long or short dimension of the grommet will be parallel to the front of the cabinet. Do not make a floor cut over a stringer. Large and extra large surface mount grommets, which cover larger openings, are available.

For further information, see CPI Koldlok® Raised Floor Grommet at www.chatsworth.com/koldlok.

2.2.3 Sealing the cabinet base to the floor

If the TeraFrame cabinet does not form a tight seal to the floor, seal the base of the cabinet with a Foam Gasket Kit (P/N 12729-001) to prevent the loss of cold air.

2.3 FRONT CABINET DOOR – REMOVING, INSTALLING, REVERSING

Doors can be removed to provide complete access to the inside of the cabinet or to reverse the door swing.

IMPORTANT: The hinge bolts must be accessible in order to reverse the door swing. If equipment mounting rails are positioned all the way forward in the cabinet, they may block access to the hinge bolts. Accordingly, if the mounting rails block access to the hinge bolts, decide which way you want the door to swing before equipment is loaded into the cabinet.

Bonding jumper wires are provided for electrically bonding the doors to the cabinet frame. If the cabinet is ordered with doors, the bonding wires are connected at the factory.

2.3.1 Removing the front door

CAUTION: The front door must remain supported during repositioning so that the hinge components are not damaged. Use blocks or have an assistant support the edge of the door opposite the hinges. Do not allow the top hinge to support the entire weight of the door during repositioning.

1. Before removing the door, be sure to unplug the quick-connect end of the bonding jumper wire from the quick-connect tab near the bottom door hinge.
2. Open the door until it is perpendicular to the cabinet. The door is perpendicular to the cabinet when it is parallel with the side of the cabinet.

3. Lift the lower hinge pin until you feel it click into position. A pin retainer keeps the hinge pins from being completely removed.

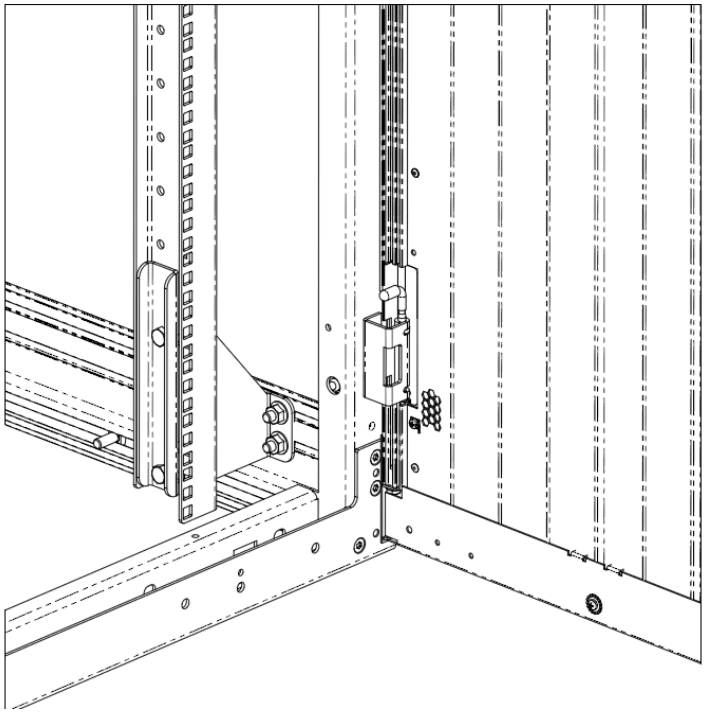


Fig. 2.3.1 Lifted lower hinge pin

4. Pull the door away from the lower hinge, and lift the door up and off the upper hinge pin.

2.3.2 Reversing the swing of the front door

You can reverse the door swing by removing the door, switching the hinges to the other side, and repositioning the door latch and lock assembly.

IMPORTANT: Before you load equipment into the cabinet, decide which way you want the door to open. If the mounting rails are positioned all the way forward in the cabinet, you may need to reposition the rails to provide access to the hinge bolts.

1. Remove the door as described in section 2.3.1 above.
2. Remove the four M6 screws that attach the hinges to the cabinet frame.

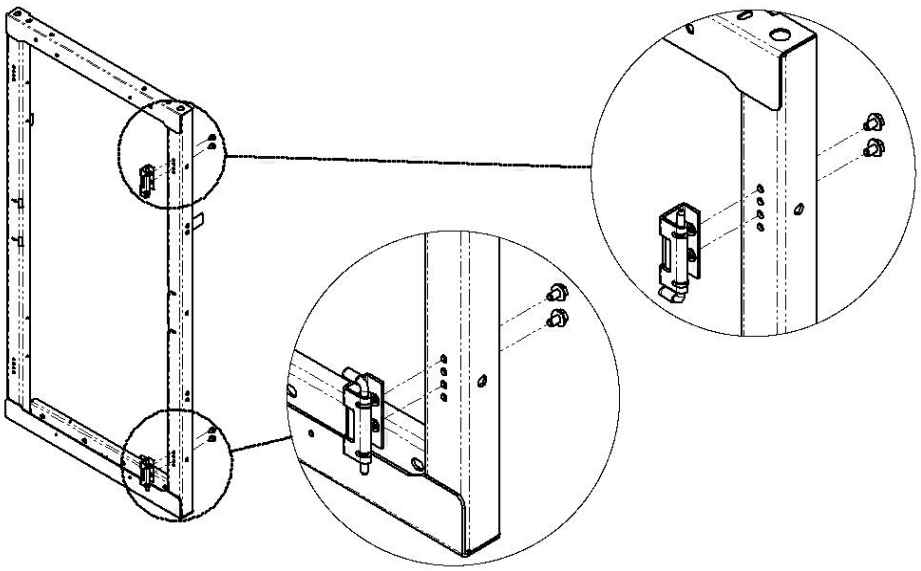


Fig. 2.3.2a Hinge attachment screws

3. Using the four M6 screws, attach hinges to holes on the opposite side of the cabinet frame, inserting the screws through the first and the third holes from the top. When the hinges are relocated to the opposite side of the frame, the upper hinge becomes the lower hinge and the lower hinge becomes the upper hinge. When the hinges are positioned correctly, the hinge pin handle of the lower hinge lifts up to disengage, and the hinge pin handle of the upper hinge pulls down to disengage.

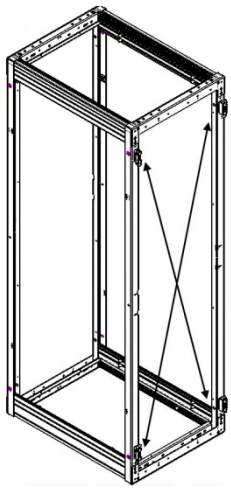


Fig. 2.3.2b Switching hinge positions

4. Turn the door over – top to bottom.
5. Reinstall the door as described in section 2.3.3 below.
6. Invert the latch and lock assembly as described below.

2.3.2.1 Inverting a single-point, cam latch

NOTE: In the following steps, the door latch and lock assembly is inverted, the direction of rotation of the lock swing handle is changed, and the latch pawl is repositioned to engage the latch striker plate. A single-point, fixed-cam latch is described but the steps will be very similar for other styles of latch and lock assemblies.

1. Reposition the door latch striker plate to the opposite side of the cabinet frame.
2. Remove the latch and lock assembly and latch faceplate from the door by removing the two clamp bar screws on the back side of the latch (see Fig. 2.3.2.1a).

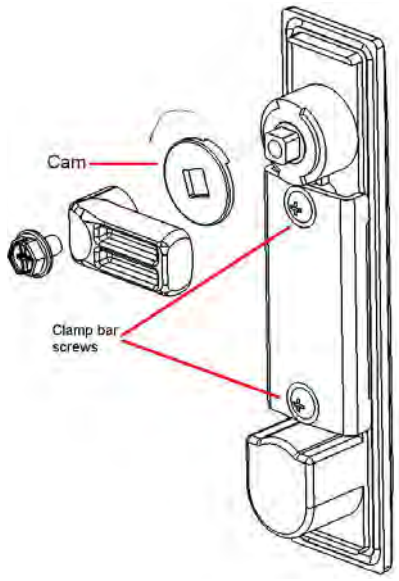


Fig. 2.3.2.1a Latch and lock assembly

3. Depending on whether the door is a front door or a rear door, the latch faceplate may or may not need to be rotated 180 degrees before being reinstalled on the door.

For a front door (see Fig. 2.3.2.1b), DO NOT rotate the latch faceplate 180 degrees before reinstalling it on the door.

For a rear door (see Fig. 2.3.2.1c), DO rotate the latch faceplate 180 degrees so that it is inverted before reinstalling it on the door. Ensure that the CPI logo is at the top of the latch.

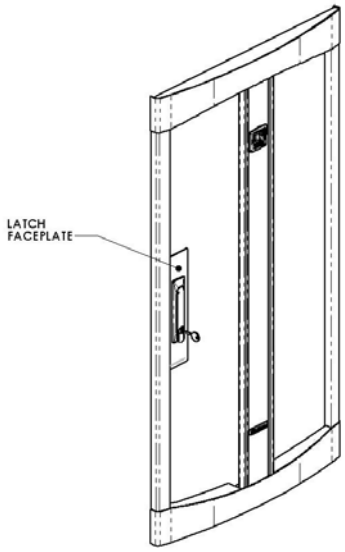


Fig. 2.3.2.1b Front door latch faceplate

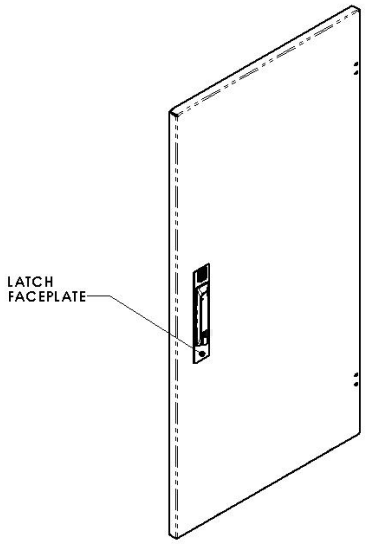


Fig. 2.3.2.1c Rear door latch faceplate

4. Rotate the latch and lock assembly 180 degrees, and reattach it and the latch faceplate to the door using the clamp bar and screws. Ensure that the key opening is at the bottom of the latch.
5. Remove the latch pawl.
6. Slide the circular metal cam off the square shaft, rotate it 90 degrees, and slide it back onto the square shaft (see Fig. 2.3.2.1a).
7. Position the pawl back on the square shaft so it is rotated 180 degrees from its previous position, and reattach the pawl on the square shaft.

2.3.2.2 Inverting a two-point, cam latch

NOTE: In the following steps, the door latch and lock assembly is inverted, the direction of rotation of the lock swing handle is changed, and the positions of the vertical latch bars are swapped. A two-point, cam latch is described but the steps will be very similar for other styles of latch and lock assemblies.

1. Remove the latch cam.

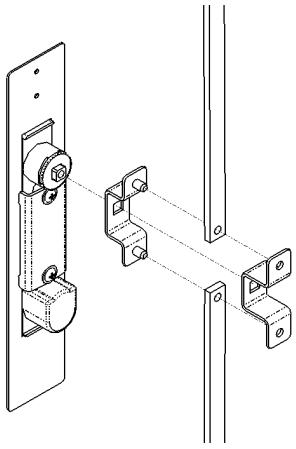


Fig. 2.3.2.2a Two-point, cam latch

2. Remove the latch and lock assembly and latch faceplate from the door by removing the two clamp bar screws on the back side of the latch (see Fig. 2.3.2.2a).
3. Depending on whether the door is a front door or a rear door, the latch faceplate may or may not need to be rotated 180 degrees before being reinstalled on the door.

   For a front door (see Fig. 2.3.2.1b), DO NOT rotate the latch faceplate 180 degrees before reinstalling it on the door.

   For a rear door (see Fig. 2.3.2.1c), DO rotate the latch faceplate 180 degrees so that it is inverted before reinstalling it on the door. Ensure that the CPI logo is at the top of the latch.
4. Rotate the latch and lock assembly 180 degrees, and reattach it and the latch faceplate to the door using the clamp bar and screws. Ensure that the key opening is at the bottom of the latch.
5. The vertical latch bars must also have their positions swapped by moving the upper bar to the lower position and the lower bar to the upper position.
6. Slide each bar outward toward the edge of the door until it is completely removed from the plastic guide (see Fig. 2.3.2.2b).

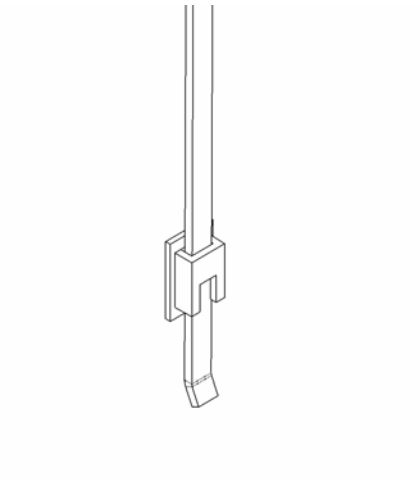


Fig. 2.3.2.2b Plastic latch bar guide

7. Reinstall each latch bar at the opposite end of the door. Note that the long bar is always on the bottom, and the short bar is on top (see Fig. 2.3.2.2c).

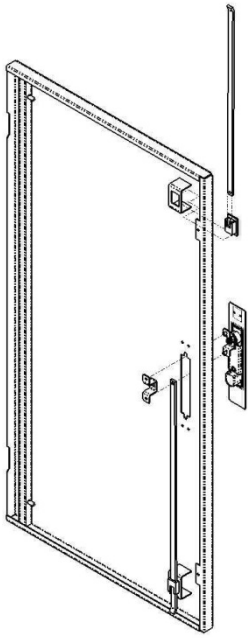


Fig. 2.3.2.2c Reinstall the latch bars

8. Reinstall the latch cam.

2.3.3 Installing the front door

CAUTION: The front door must remain supported during assembly so that the hinge components are not damaged. Use blocks or have an assistant support the edge of the door opposite the hinges. Do not allow the top hinge to support the entire weight of the door during assembly.

1. Configure the upper and lower hinge pins in their upper-most positions so that the end of the upper hinge pin is extended and the end of the lower hinge pin is recessed.
2. Orient the front door perpendicular to the cabinet, with the lower part of the door tilted sideways slightly away from the cabinet (see Fig. 2.3.3a).

Fig. 2.3.3a Installing the front door

3. Carefully lower the door onto the upper hinge pin. Be sure that the hinge pin aligns correctly with the hinge pivot axis cavity in the door frame (see Fig. 2.3.3b).

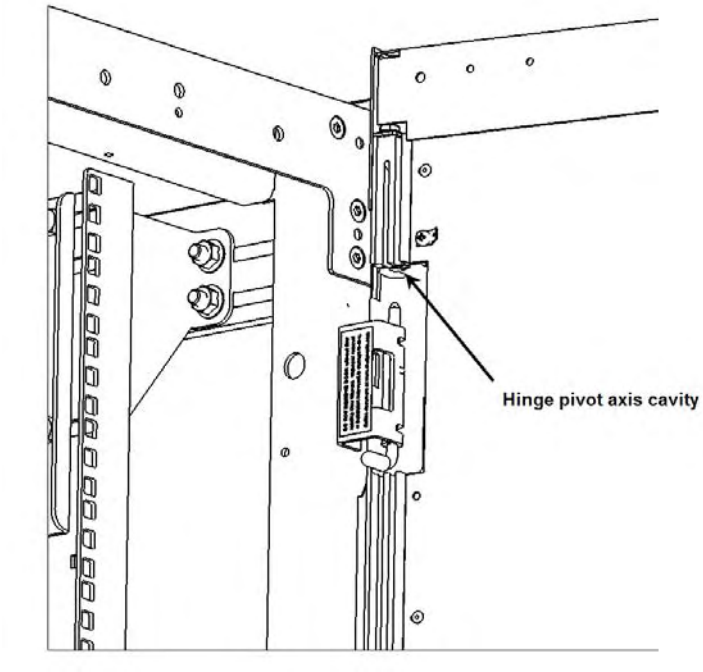


Fig. 2.3.3b Hinge pivot axis cavity

4. Bring the door frame vertical and align the lower hinge pin with the hinge pivot axis in the door extrusion. Engage the lower hinge pin in the door by pushing it downward until it clicks into place.

CAUTION: Before swinging the door, confirm that both top and bottom hinge pins are in the correct cavities of the door frame member. Swinging the door while the hinges are positioned in the wrong cavity may damage the door and/or the hinge.

5. Electrically bond the door to the cabinet frame by plugging the quick-connect end of the bonding jumper wire onto the quick-connect tab nearest the lower door hinge.

2.4 REAR CABINET DOOR – REMOVING, INSTALLING, REVERSING

2.4.1 Removing a single rear door

CAUTION: Keep the rear door closed while removing the hinge pins. An open door will fall off the cabinet when the pins are removed. When remounting the door, be sure to reinsert the hinge pins. If the

hinge pins are not reinserted, the door could fall off the next time it is opened.

NOTE: The hinges have a notch feature that prevents them from engaging unless the door is perpendicular to the cabinet. The door is perpendicular to the cabinet when it is parallel to the side of the cabinet.

1. Before removing the door, be sure to unplug the quick-connect end of the bonding jumper wire from the quick-connect tab near the bottom door hinge.
2. With the door closed, remove the hinge pins by pushing the pins up from the bottom with a tool such as a small screwdriver. Grasp the pin head and pull the pin out the rest of the way (see Fig. 2.4.1a).

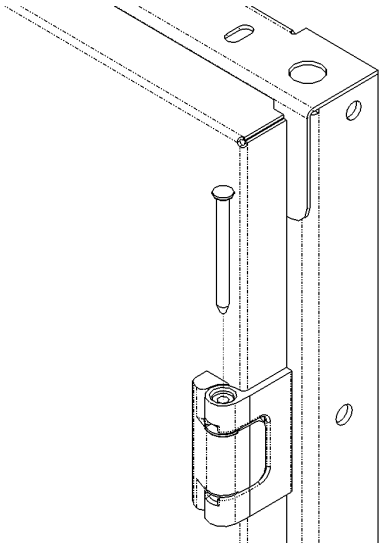


Fig. 2.4.1a Removing the hinge pin

3. Hold the door firmly with a hand on each side. Open the door until it is perpendicular to the cabinet, and slide the door out of the hinges (see Fig. 2.4.1b).

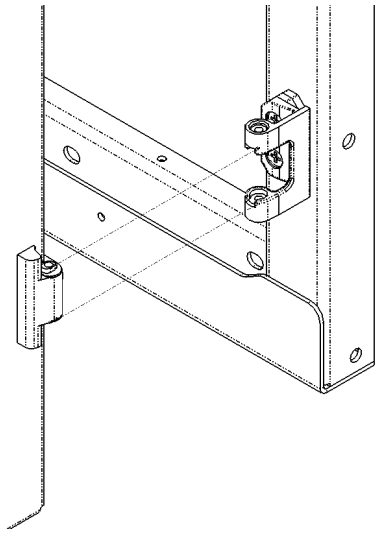


Fig. 2.4.1b Removing the door

2.4.2 Reversing the swing of a single rear door

You can reverse the door swing by removing the door, switching the hinges to the other side, and repositioning the door latch and lock assembly.

1. Remove the door as described in section 2.4.1 above.
2. Remove the hinges from the cabinet frame and remount them on the opposite side of the cabinet frame. Insert the hinge screws through the first and the third holes from the top (see Fig. 2.4.2).

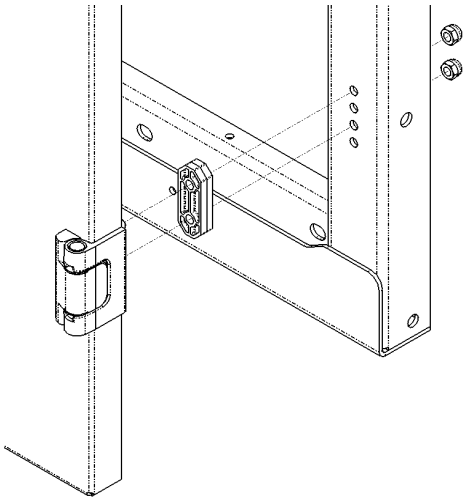


Fig. 2.4.2 Rear door hinge

3. Turn the door over – top to bottom.
4. Reinstall the door as described in section 2.4.3 below.
5. Invert the latch and lock assembly as described in sections 2.3.2.1 and 2.3.2.2 above.

2.4.3 Installing a single rear door

CAUTION: When remounting the door, be sure to reinsert the hinge pins. If the hinge pins are not reinserted, the door could fall off the next time it is opened.

NOTE: The hinges have a notch feature that prevents them from engaging unless the door is perpendicular to the cabinet. The door is perpendicular to the cabinet when it is parallel to the side of the cabinet.

1. Hold the door firmly with a hand on each side. With the door held perpendicular to the cabinet, slide the door onto the hinges.
2. Insert the hinge pins into the hinges from the top. Push the pins down into the hinges until their tops are flush with the tops of the hinges. It may be necessary to lightly tap on the tops of the hinge pins to seat them.
3. Electrically bond the door to the cabinet frame by plugging the quick-connect end of the bonding jumper wire onto the quick-connect tab nearest the lower door hinge.

2.4.4 Double rear door – removing, installing

Removing

Each half-door of a double door arrangement is removed as described for a single door in section 2.4.1 above. The door swing of double doors is not intended to be changed.

Installing

Each half-door of a double door arrangement is installed as described for a single door in section 2.4.3 above.

2.5 OPERATING DOOR LATCHES AND LOCKS

2.5.1 Operating single-point, fixed-cam latch with keyed lock

This style of latch is used only on single (non-double) doors.

To open the door:

1. Unlock with the key.
2. Pull the lock swing handle out, rotate it, and open the door.

To close the door:

1. With the lock swing handle rotated to the open (unlatched) position, close the door.
2. Rotate the swing handle to the vertical (latched) position, and push it in.
3. Lock with the key.

2.5.2 Operating single-point, slam-cam latch with keyed lock

This style of latch is used only on single (non-double) doors.

To open the door:

1. Unlock with the key.
2. Pull the lock swing handle out, rotate it, and open the door.

To close the door:

1. With the lock swing handle in the vertical position, close the door.
2. Push in the swing handle.
3. Lock with the key.

2.5.3 Operating two-point, cam latch with keyed lock

This style of latch is used on single or double doors.

To open the door:

1. Unlock with the key.
2. Pull the lock swing handle out, rotate it, and open the door.

To close the door:

1. With the lock swing handle rotated to the open (unlatched) position, close the door.
2. Rotate the swing handle to the vertical (latched) position, and push it in.
3. Lock with the key.

2.5.4 Operating a combination lock

The combination lock is opened with a three-digit code, entered by turning three dials built into the lock swing handle. The lock can also be opened with a key (see Fig. 2.5.4a). The combination can be changed if you know the existing combination. The lock is set at the factory with the combination "000".

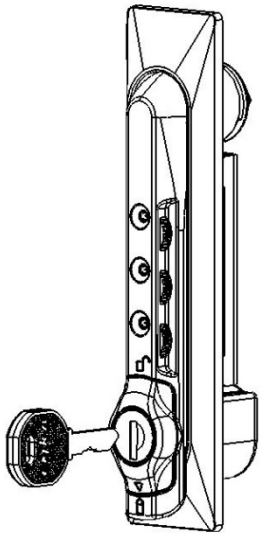


Fig. 2.5.4a Combination lock

To open the door when the cabinet is first received:

1. Dial in the factory-set combination "000".
2. Turn the wing knob 180 degrees counterclockwise until the arrow points up (unlocked sign). Lift the lock swing handle and turn (see Fig. 2.5.4b).

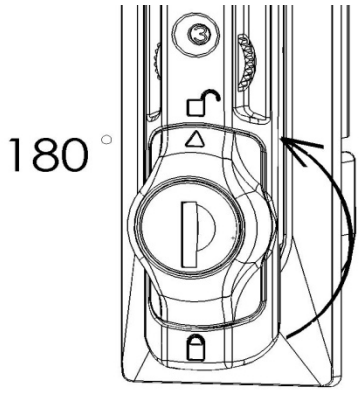


Fig. 2.5.4b Unlocking the lock

3. To relock, return the swing handle to the vertical (latched) position, push it in, turn the wing knob 180 degrees clockwise to lock, and then scramble the dials.

<u>To change the combination:</u>

NOTE: To change the combination, the existing code must be known. The factory-set combination is "000". If the combination is unknown, you can use the key to unlock the door and gain access to the cabinet.

1. Be sure the key lock is in the locked position (arrow on the wing knob points down).
2. Dial in the existing combination.
3. Turn the wing knob 180 degrees + 15 degrees counterclockwise (see Fig. 2.5.4c).

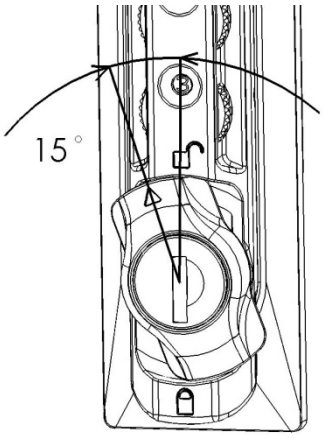


Fig. 2.5.4c Changing the combination

4. Set the new numbers on the three dials.
5. Turn the wing knob 15 degrees clockwise. The new combination is now set.
6. Turn the wing knob 180 degrees clockwise to lock, and then scramble the dials.

2.6 SIDE PANEL – REMOVING, INSTALLING

Bonding jumper wires are provided for electrically bonding the side panels to the cabinet frame. If the cabinet is ordered with side panels, the bonding wires are connected at the factory. The side panels can be removed and reinstalled on a fully populated cabinet.

2.6.1 Removing the side panel

1. Be sure to unplug the quick-connect end of the bonding jumper wire from the side panel before removing the side panel (see Fig 2.6.1).

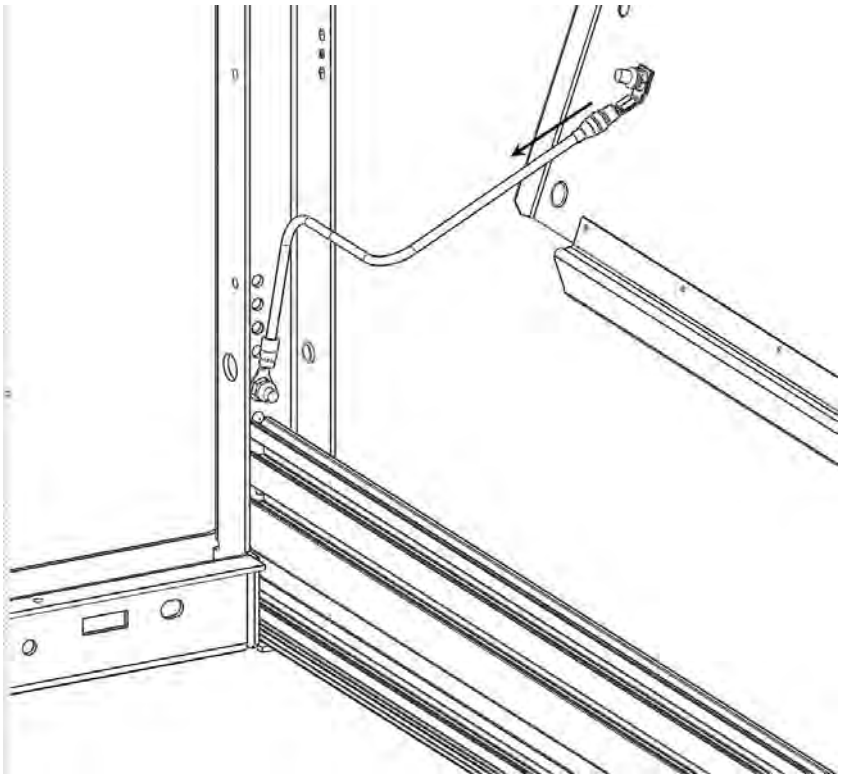


Fig. 2.6.1 Bonding jumper wire

2. Use the key to unlock the side panel latches.
3. Push the latches toward the center of the panel, then tilt the panel away from the frame, and lift it off.

2.6.2 Installing the side panel

1. To install the side panel, tilt the top of the panel 10 degrees away from the cabinet and guide the flange at the bottom of the panel over the edge of the frame. Rotate the panel toward the cabinet until flush with the outer frame and latches click into place (see Fig. 2.6.2).

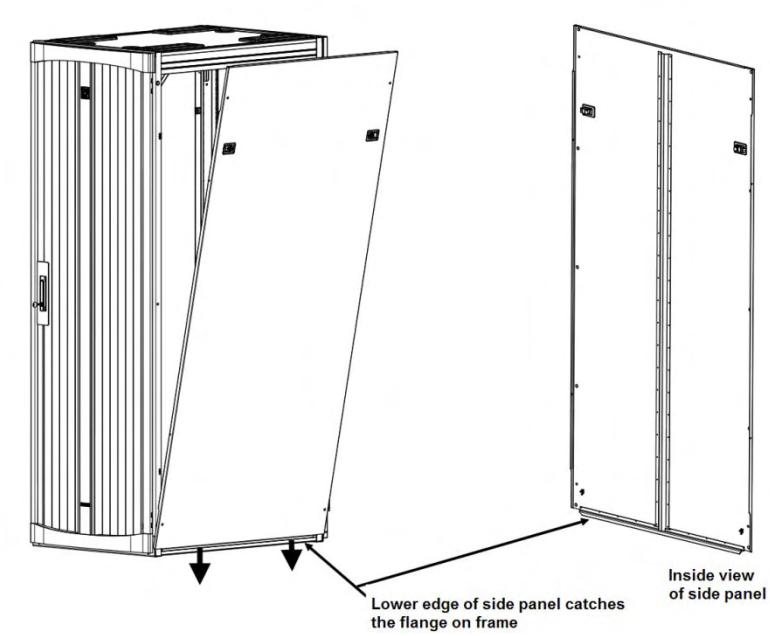


Fig. 2.6.2 Installing the side panel

2. If desired, use the key to lock both latches.
3. Be sure to electrically bond the side panel to the cabinet frame by plugging the quick-connect end of the bonding jumper wire onto the quick-connect tab on the side panel (see Fig 2.6.1).

2.7 TOP PANEL INSTALLATION

The top panel is electrically bonded to the cabinet frame by special internal-external tooth star washers used under the heads of the four screws that attach the top panel to the frame. If the cabinet is ordered with a top panel, the star washers are installed at the factory.

1. Place the top panel on the flanges that extend horizontally from the side frame members at the top of the frame.
2. Attach the top panel to the frame using four M6 Phillips-drive, pan head screws with a special star washer under each screw head. Be sure to use a star washer under each screw head because the washers electrically bond the top panel to the cabinet frame (see Fig. 2.7).

NOTE: Top panel styles may vary.

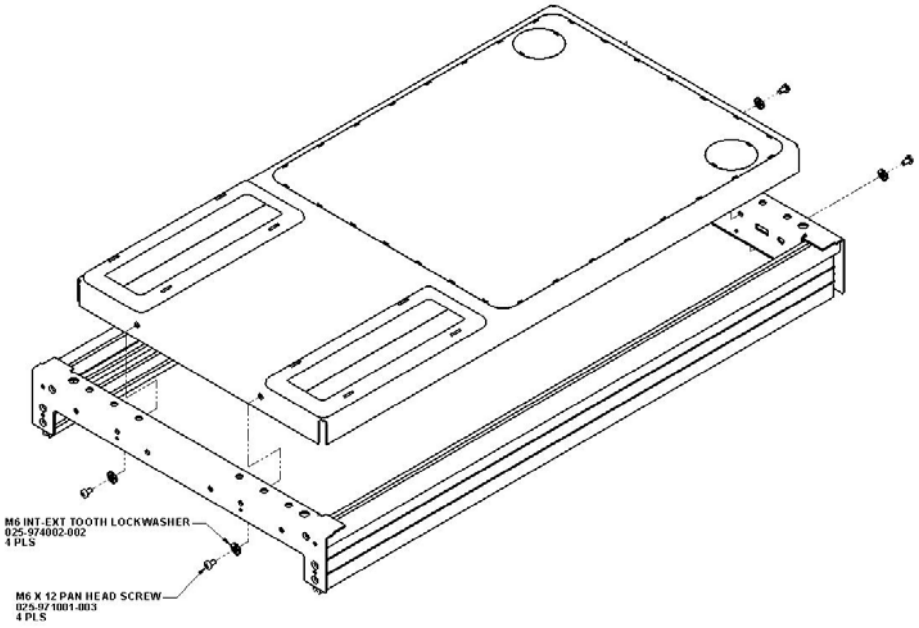


Fig. 2.7 Installing the top panel

2.8 BONDING AND GROUNDING THE CABINET

Bonding jumper wires and bonding connection points are provided that electrically bond the cabinet side panels, doors, top panel, and equipment mounting rails to the cabinet frame. These bonding jumper wires and connection points are included with the cabinet, and they are connected at the factory. In addition, a ground terminal block is attached to the cabinet frame at the factory.

2.8.1 Connecting ground terminal block to ground conductor

WARNING: For protection of the equipment and personnel, ground each cabinet individually to the Telecommunications Equipment Bonding Conductor (TEBC) or Signal Reference Structure (SRS).

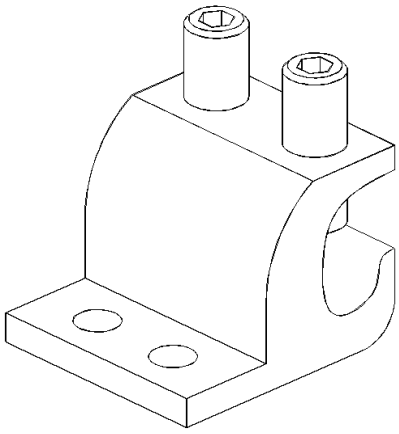


Fig. 2.8.1a Ground terminal block

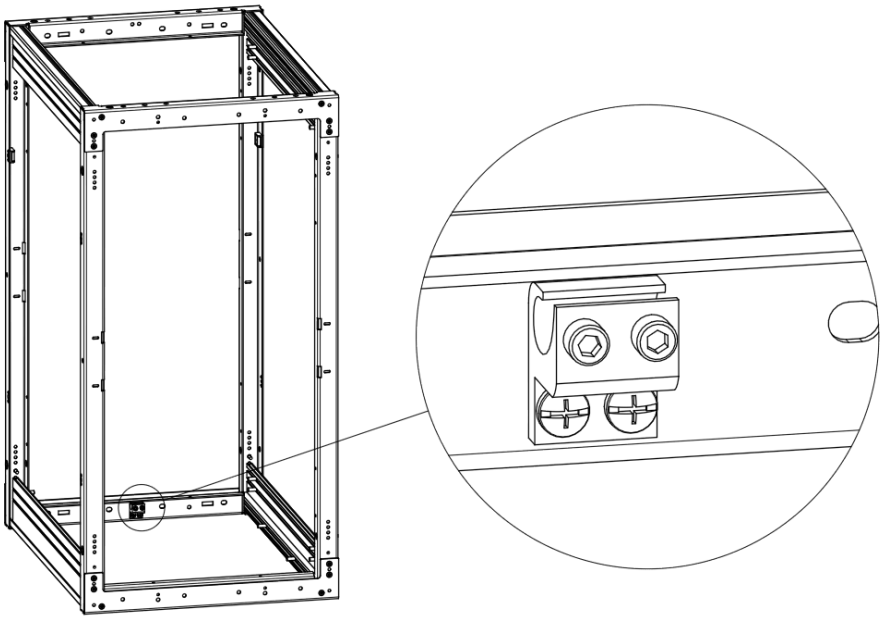


Fig. 2.8.1b Ground terminal block attached to frame

A ground terminal block is factory installed at one of two locations provided on the cabinet frame (see Fig. 2.8.1a and Fig. 2.8.1b). Follow the instructions below for

positioning the terminal block in your desired location and attaching it to the ground conductor:

1. Locate the two mounting locations provided for the terminal block.
   - The primary location is at the inside of the lower rear frame member. The terminal block is factory installed at this location.
   - Alternate mounting locations are provided at a similar position on the inside of the upper and lower frame member. A removable sticker masks the surface of the frame member to keep it free of paint at this location.
2. Determine, for your situation, which one of the mounting locations should be used for the terminal block.
3. If the location where the terminal block is factory installed is correct for your situation, skip to Step 8.
4. If the alternate location is correct for your situation, remove the terminal block from the primary location by removing the two M6 screws and nuts. Do not discard the two M6 screws and nuts.
5. Remove the paint mask sticker at the alternate location – uncovering a bare metal surface with two mounting holes for the terminal block.
6. Apply a generous coating of gray antioxidant paste (provided) to the bare metal surface. One tube of gray antioxidant paste (Part No. 40166-101) is in the bag of hardware included with the cabinet.
7. Use the two M6 screws and nuts to attach the terminal block at the alternate location and in the correct orientation (see Fig. 2.8.1 b).
8. Insert ground conductor in terminal block and secure two set screws using 48 inch-pounds of torque.

NOTE: Cabinet grounding should be in accordance with TIA/EIA-607 standards.

2.8.2 Bonding connections to doors and panels

Before removing a side panel or door from the cabinet frame, be sure to disconnect the bonding jumper wire at the end with the tab-type, quick-connect connector. Make a note of where and how the bonding jumper wire was connected. The top panel is bonded to the cabinet frame using special internal-external tooth star washers under the heads of the screws that attach the top panel to the frame. The star washers break through the paint and ensure that the top panel is electrically bonded to the frame.

When reattaching a side panel or door to the cabinet frame, be sure to reconnect the bonding jumper wire at the same location where it was previously disconnected. When reattaching the top panel, be sure to reinstall the special star washers under the heads of the screws that attach the top panel to the frame.

See sections 2.3, 2.4, 2.6, and 2.7 for detailed information concerning the removal and installation of doors, side panels, and top panel, respectively.

2.8.3 Bonding connections to equipment mounting rails

Equipment mounting rails and rail spacers are plated rather than painted to facilitate electrical bonding of equipment chassis to the mounting rails.
Rail spacers are used for 700 mm and 800 mm wide cabinets, but rail spacers are not used on 600 mm wide cabinets.

See section 3.1 for detailed information concerning the repositioning of equipment mounting rails.

2.9 BAYING CABINETS

Cabinets may be bayed together with side panels in place, or with a shared side panel, or without side panels, depending on data center requirements.

Use the series 35069 baying kit to bay and align all cabinets except 600 mm wide cabinets aligned to 24 inch floor tiles. Use the series 35068 baying/spacer kit to bay 600 mm wide cabinets aligned to 24 inch floor tiles.

2.9.1 Installing the series 35069 baying kit

Parts list

- 2 baying brackets
- 4 M6 screws
- 4 washers

To install the baying bracket:

1. Position two cabinets side by side. They must be of equal height and depth.
2. Place a baying bracket above the top frame at the front and rear of the cabinets.
3. Attach the brackets with M6 screws and washers. See Fig. 2.9.1.

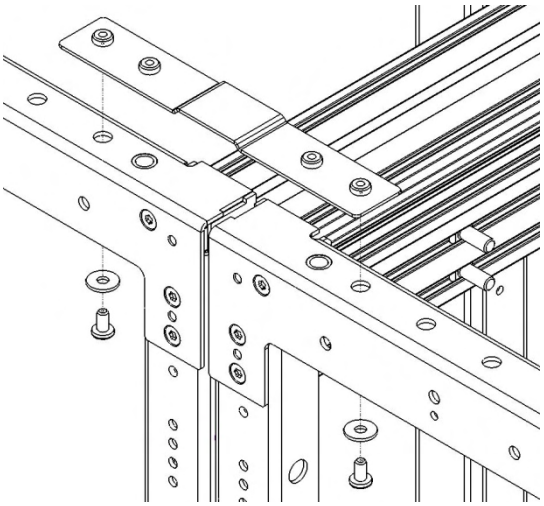


Fig. 2.9.1 Attaching the baying bracket

2.9.2 Installing the series 35068 baying/spacer kit

Use the 35068-series baying/spacer kit only for the 600 mm wide cabinet when it is bayed on 24 inch access floor tiles and when cabinet-to-tile alignment is required.

NOTE: With the cabinets anchored directly to the floor, attach the top of the frame, front and back.

Parts list

- 2 screw-type baying brackets
- 2 adhesive baying brackets
- 2 extrusions
- 4 M6 screws
- 4 metal washers
- 4 plastic retaining washers
- 4 M4 screws

To install the baying bracket:

1. Center cabinets on the floor tiles. The cabinets must be of equal height and depth. There will be a gap between the cabinets of about 0.4 to 0.5 inch.
2. Place a baying bracket above the top frame at the front and rear of the cabinets.
3. Attach the brackets with M6 screws and washers (see Fig. 2.9.1 for the mounting location). The bracket looks like Fig. 2.9.2.3a.

4. Attach the extrusion:
   a. **If side panels are installed**, put an M4 screw through the extrusion and place three plastic retaining washers on each screw (see Fig 2.9.2.3a).

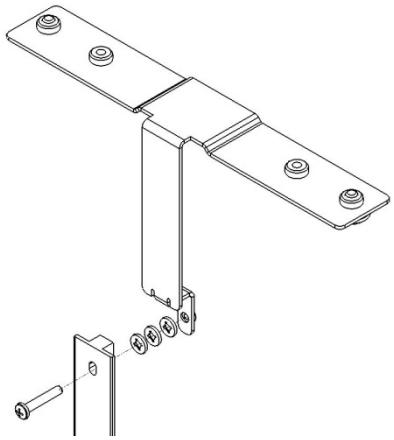


Fig. 2.9.2.3a Attaching the extrusion with side panels

   b. **Without side panels**, attach the extrusion with M4 screws (no washers) at the top and bottom (see Fig. 2.9.2.3b).

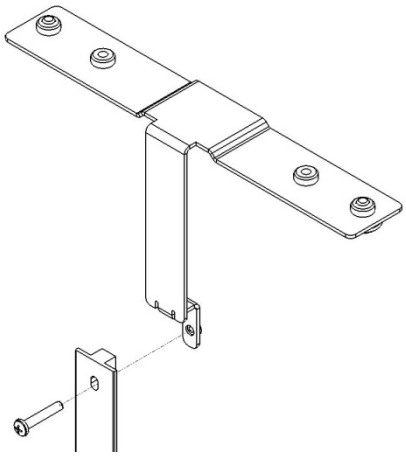


Fig. 2.9.2.3b Attaching the extrusion without side panels

5. Attach the two adhesive brackets to the extrusion with M4 screws (see Fig. 2.9.2.3c).

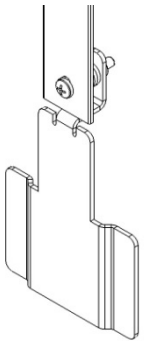


Fig. 2.9.2.3c Attaching the adhesive bracket

6. Orient the bracket as shown below, remove the tape backing and press firmly against the frame (see Fig. 2.9.2.3d).

   IMPORTANT: Do not attach the adhesive bracket to the frame until the top extrusion has been connected. This will help properly locate the lower adhesive bracket. Note that the adhesive is **very** strong; take care to orient the bracket correctly as shown below, then remove the tape backing and press firmly against the frame.

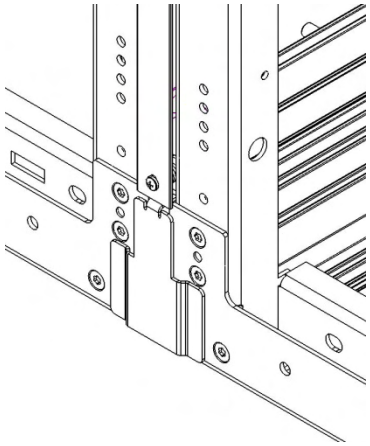


Fig. 2.9.2.3d Adhesive bracket in place

2.10 ALIGNING OVERHEAD CABLE PATHWAYS

Install overhead cable pathways to route patch cords between cabinets. See FastTrac/OnTrac Cable Tray Installation Instructions at http://www.chatsworth.com/Product_Docs/IIS-713340.PDF for proper installation.

- Elevate pathways 6 to 12 inches above the cabinet and center them to the front or back of the cabinet. Alignment will depend on the top panel style and routing of cables.
- The server cabinet top panel has two brush access ports on one end and two round ports on the other end – one port in each corner. Vertical exhaust ducts are recommended on larger cabinets (1050 mm – 1200 mm deep). When a vertical exhaust duct is used or anticipated, the brush access ports are placed in the front for routing data and power cables from overhead. For smaller cabinets, the brush access ports can be placed at the front or the rear for routing data and power cables brought in from overhead.
- The network top has two brush access ports on each end. The front pair accommodate patch cords and the rear pair handle horizontal-network cabling (if not brought in from under the floor).
- Support cable pathways from the ceiling, not from the cabinet. This allows for variations in cabinet height and for cabinet relocation.
- Take care not to block top vents or exhausts.
- Use multiple tiers of pathways or cable trays, one for power cables and one or two for telecommunications cables.

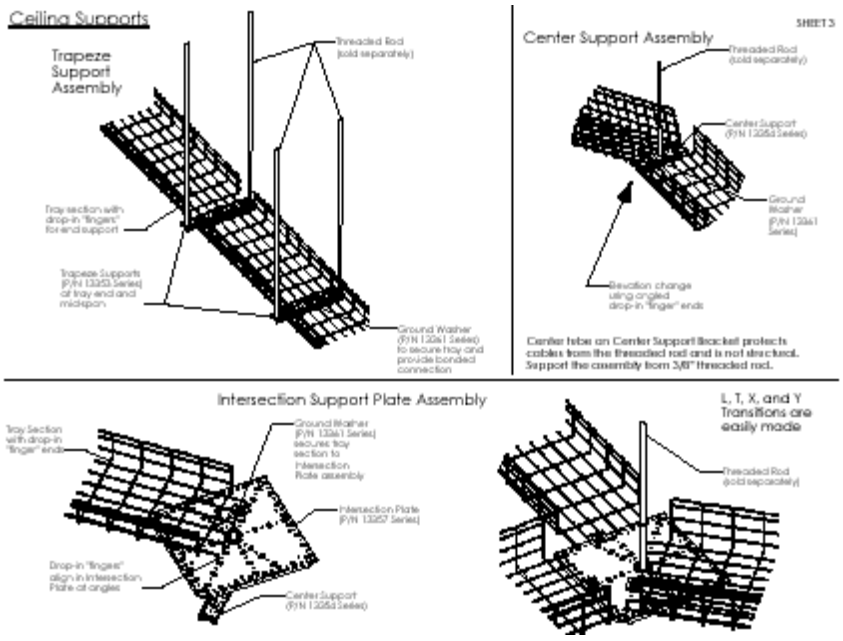


Fig. 2.10 Overhead cable pathways

2.10.1 Bonding and grounding overhead cable pathways

Ensure that pathways are properly grounded in accordance with prevailing code and the authority having jurisdiction (AHJ). Follow standards established by the National Electric Code (NEC) and TIA/EIA 607 and 942. Bond the pathway to the Signal Reference Structure (SRS) or the Telecommunications Grounding Busbar (TGB), using the appropriate hardware.

2.10.2 Aligning radius drops with top cable access

Radius drops allow you to maintain proper bend radius to prevent cable tears, tangles, and stretching. Add a radius drop wherever cable enters or exits the pathway to maintain a gradual bend in the cable, which helps maintain signal quality on the cables. Bend radius is in accordance with cable manufacturing specifications or the guidelines in TIA/EIA-568-B.1 standard. Positioning of the drops relative to the top of the cabinet follows the same discussion as above. You can use the stringer radius drop (12101-Series) to drop off of the back of runway into the brushes in the server top, and the cross member radius drop (12100-Series) to go into the brush openings in the network top.

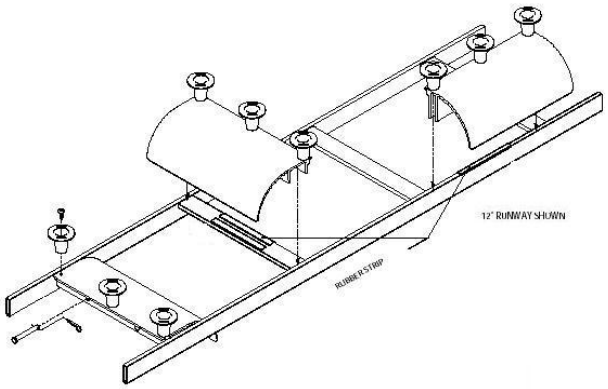


Fig. 2.10.2 Radius drop with server top cable access

2.11 ALIGNING UNDERFLOOR CABLE PATHWAYS AND FLOOR PASS-THROUGHS

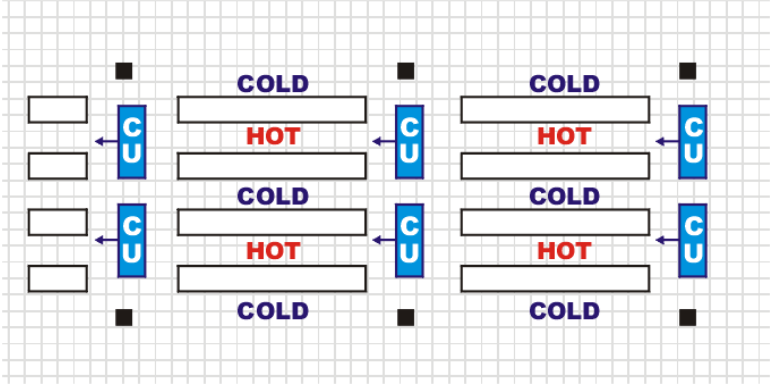


Fig. 2.11 Hot aisle/cold aisle layout

If both power and data cables are located under the access floor, provide separate ingress for each type of cable; for example, bundle all power cables and pass through one Koldlok grommet, and bundle all data cables to enter via a separate Koldlok grommet (see section 2.2.2).

2.11.1 Supporting under-floor cable pathways

Use FastTrac/OnTrac cable trays (P/N 13345-020) to support cable within access floor plenums.

FastTrac/OnTrac floor supports (P/N 13350-020) include under-floor support brackets for the FastTrac/OnTrac cable tray. Under-floor support brackets attach directly to the concrete subfloor. Be sure to support cable pathways from the subfloor, not the floor pedestals. See http://www.chatsworth.com/Product_Docs/IIS-713340.PDF for proper installation.

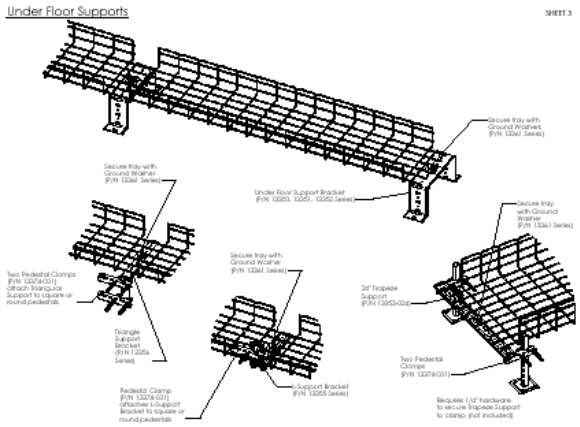


Fig. 2.11.1 Attachment of underfloor cable pathway

Chapter 3. Installing Equipment

3.1 EQUIPMENT MOUNTING RAILS

Four vertical equipment mounting rails are installed at the factory, two in the front of the cabinet and two in the back. The mounting rails can be adjusted in depth to provide secure four-point attachment for equipment.

EXCEPTION: The 34470-Series internal air duct is integrated with its own fixed-position front equipment mounting rails. If ordered with the cabinet, the rails and air duct are factory-installed at the front of the cabinet.

The cabinet may be ordered with two different styles of equipment mounting rails:

- 35009-Series square-punched rails – preferred for rack-mount computer server and data storage equipment because they use snap-in cage nut hardware that can be changed to match equipment mounting requirements.
- 35008-Series drilled and tapped (12-24 thread) rails – preferred for panel-mount network and cable termination equipment because they make installation faster and easier.

Both styles feature the EIA-310-D Universal 5/8"-5/8"-1/2" alternating hole pattern and have marked and numbered rack-mount spaces (RMU).

3.1.1 Moving mounting rails

CAUTION: For optimal load bearing capacity, move the mounting rails back no more than 10 inches (250 mm) from the front or rear of the cabinet.

The equipment mounting rails attach to the inward-facing slide tracks of the frame which allows them to be moved without being removed and reinstalled. Simply loosen the nuts attaching the rail or rail spacer to the frame, slide the rails and retighten the nuts. Positioning the rails using the printed scale on the slide extrusion is an easy way to ensure that the rails are vertically aligned.

3.1.1.1 Moving mounting rails on 600 mm wide cabinets

In 600 mm (24 inch) wide cabinets, equipment mounting rails attach directly to the frame. The plated mounting rails are electrically bonded to the frame when the provided hardware is used.

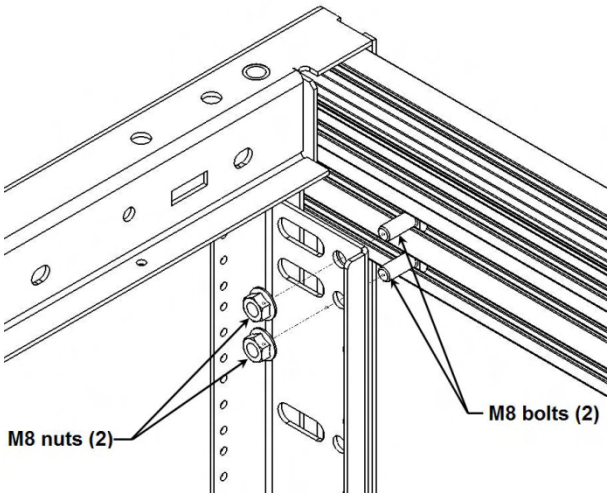


Fig. 3.1.1.1 Equipment mounting rail for 600 mm wide cabinet

To move an equipment mounting rail on a 600 mm wide cabinet frame:

1. Loosen the nuts attaching the rail to the inward-facing slide tracks at the top and bottom of the frame.
2. Slide the rail forward or backward, then retighten the nuts.

3.1.1.2 Moving mounting rails on 700 or 800 mm wide cabinets

In 700 mm (28 inch) or 800 mm (32 inch) wide cabinets, the rail kit includes bolt-on brackets (rail spacers) to adapt the 19 inch EIA mounting rails to the wider frames. The equipment mounting rails are electrically bonded to the frame when the provided hardware is used.

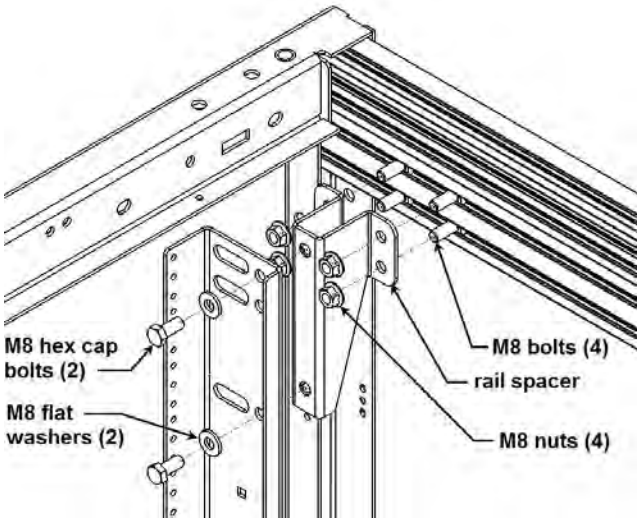


Fig. 3.1.1.2a Equipment mounting rail for 700 mm wide cabinet

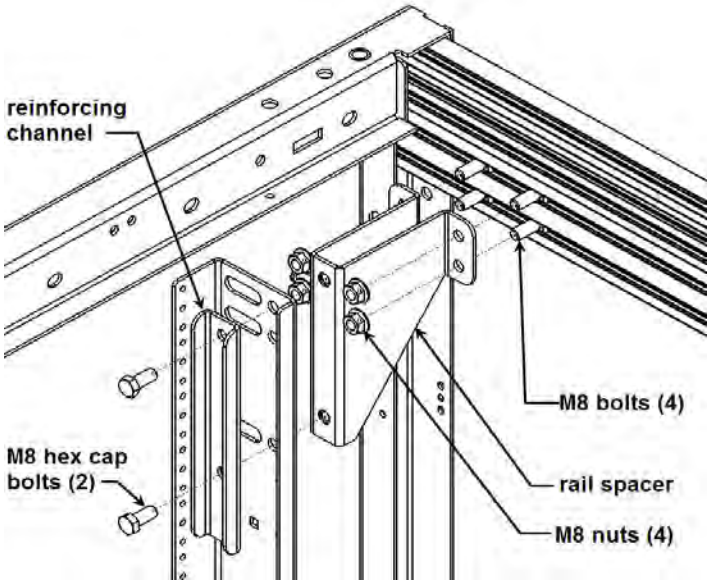


Fig. 3.1.1.2b Equipment mounting rail for 800 mm wide cabinet

To move an equipment mounting rail on a 700 mm or 800 mm wide cabinet frame:

1. Loosen the nuts attaching the rail spacers to the inward-facing slide tracks at the top and bottom of the frame.

2. Slide the rail forward or backward, then retighten the nuts.

3.1.2 Adding mounting rails

Equipment mounting rails may be purchased in pairs and added to the cabinet. If the mounting rails are purchased separately, they should be installed in accordance with the installation instructions supplied with the rails.

3.2 ADDING/ADJUSTING CABLE MANAGEMENT

3.2.1 Vertical cable management

NOTE: This accessory can be factory-installed in the cabinet/frame, or it can be purchased separately. If purchased separately, follow the installation instructions supplied with the accessory.

Vertical cable managers are available for 600 mm, 700 mm, and 800 mm wide TeraFrame cabinets. Three M6 carriage bolts attach the cable manager at the top, middle, and bottom of the mounting rail. The cable manager attaches permanently to the equipment mounting rail and moves as a unit if the mounting rail is relocated.

To adjust the cable manager, loosen the bolts and slide the cable manager on the keyhole slots, then retighten the bolts. The cable manager can be adjusted back and forth nearly one inch. See Fig. 3.2.1.

In 700 mm and 800 mm wide cabinets, cable managers require a minimum mounting rail setback of 4.5 inches (114 mm).

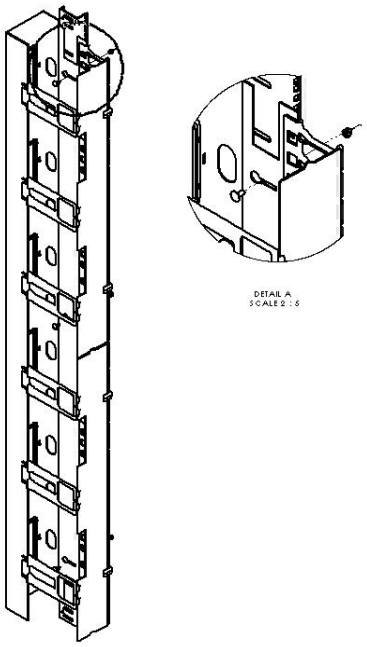


Fig. 3.2.1 Vertical cable manager

T-shaped plastic fingers separate and channel the cables into each RMU. Fingers are attached to the cable manager with no cover in the 600 mm wide cabinet. The 600 mm wide cabinet can hold one, two, or four cable managers; each having a capacity of 45 Cat 6a cables.

Fingers are attached to the cable manager in the 700 mm and 800 mm wide cabinets and include a snap-on cover to protect the cables and allow access for cable adjustment.

The 700 mm wide cabinet can hold up to four cable managers, with the following estimated cable fill capacity:

Cable size	**No. of cables (50% full)**
Cat 5e	355
Cat 6	230
Cat 6a	175

The 800 mm wide cabinet can hold up to four cable managers, with the following estimated cable fill capacity:

Cable size	No. of cables (50% full)
Cat 5e	610
Cat 6	390
Cat 6a	295

3.2.1.1 Fiber slack management

NOTE: This accessory can be factory-installed in the cabinet/frame, or it can be purchased separately. If purchased separately, follow the installation instructions supplied with the accessory.

Fiber management spools are available from CPI (P/N 12765-702 and P/N 12765-706). These spools, mounted on the vertical cabling sections, provide proper cable support, bend radius, slack management, and maintain strength under heavy cable loads. Additional slack management can be provided by a horizontal cable tray. See section 3.2.2.

3.2.2 Horizontal cable management

NOTE: This accessory can be factory-installed in the cabinet/frame, or it can be purchased separately. If purchased separately, follow the installation instructions supplied with the accessory.

There are two types of horizontal cable managers: a two-piece front-to-rear cable tray and a two-piece cable trough.

The horizontal cable tray (rack-mount cable shelf, P/N 13517-701) permits side-to-side and front-to-back transition of cable within the cabinet and between adjacent bayed cabinets. The tray extends from 22 to 40 inches and features brush openings for cables along the front panel.

Fig. 3.2.2a Horizontal cable tray

The front-to-back cable manager hooks to vertical cable managers. If the vertical managers are repositioned, the horizontal troughs slide apart and are moved with the vertical managers, then are reintegrated at the new position.

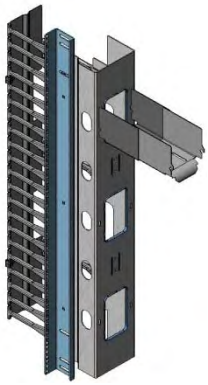


Fig. 3.2.2b Front-to-back cable manager

Two troughs are sized for the cable manager that fits the 700 mm wide cabinet. The longer trough extends from 10 to 17 inches, and the shorter trough extends from 6 to 10 inches. The trough sections fasten with two screws in the bottom. For a small adjustment, loosen the screws to slide the troughs the length of a slot. To extend the troughs further, remove the screws, reposition the trough sections, and refasten the screws.

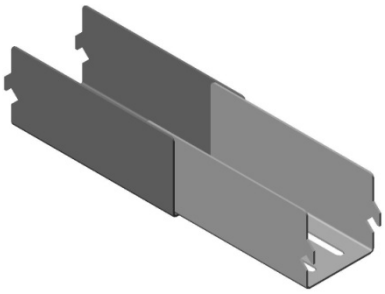


Fig. 3.2.2c Extending the front-to-back cable manager

The cable trough that fits the 800 mm wide cabinet comes in two sizes and includes a radius bend. The longer trough extends from 10 to 17 inches, and the shorter trough extends from 6 to 10 inches.

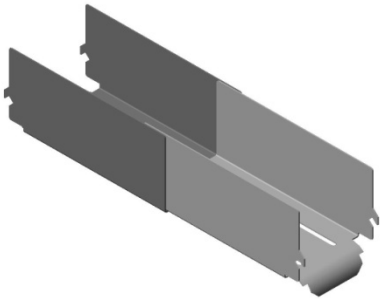


Fig. 3.2.2d Cable manager with radius bend

3.3 VERTICAL POWER MANAGERS

NOTE: This accessory can be factory-installed in the cabinet/frame, or it can be purchased separately. If purchased separately, follow the installation instructions supplied with the accessory.

The vertical power cord manager comes in two sizes: C-shaped, 8-inch wide (34582-Series) and L-shaped, 2.5 inch wide (34581-Series). Up to four power strips can be mounted in the wide manager and up to two power strips in the narrow manager.

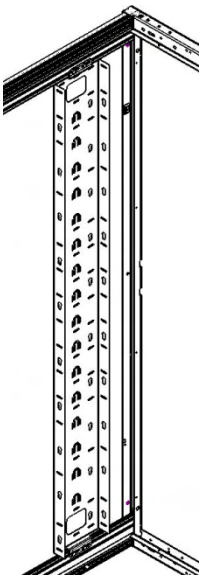


Fig. 3.3a Vertical power cord manager (wide)

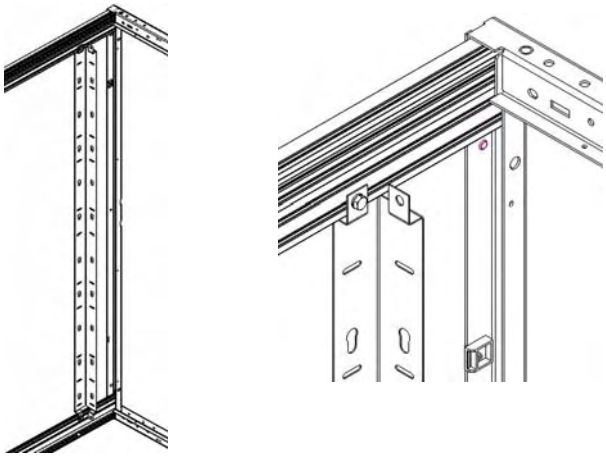


Fig. 3.3b Vertical power cord manager (narrow)

Optional power strips, spools, and other power cord management tools are available from CPI.

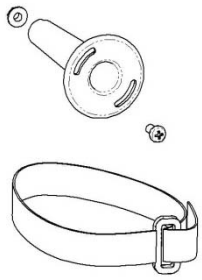


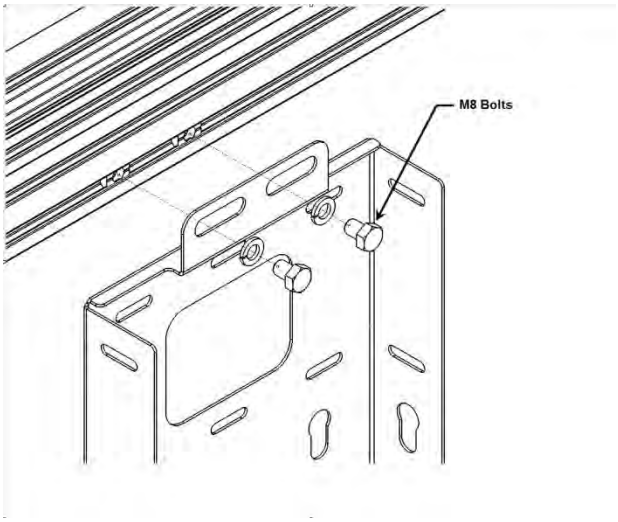
Fig. 3.3c Cable spool and Saf-T-Grip strap

Use hardware included in the power strip kit to hold power strips in the bracket. For non-CPI power strips or PDUs, see section 3.3.3.

3.3.1 Adjusting the vertical power cord manager

NOTE: When adjusting the vertical power cord manager, be sure to move the whole bracket assembly (the bracket plus any adapter plates).

1. Loosen the bolts holding the vertical power cord manager to the inward-facing slide tracks of the cabinet frame.



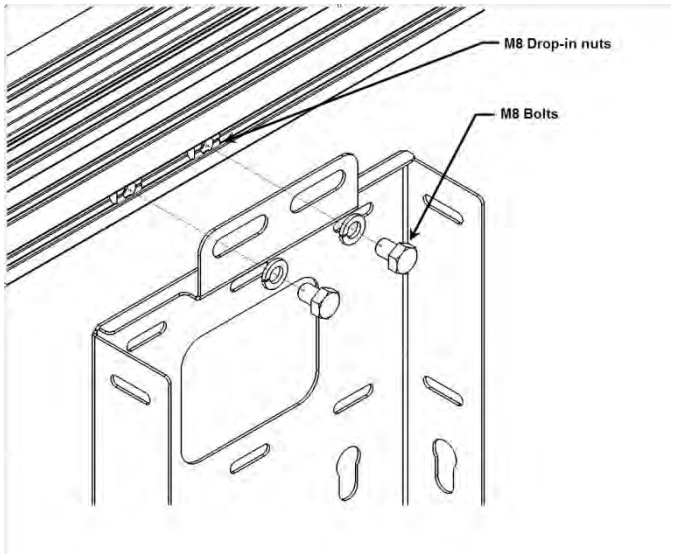


Fig. 3.3.1a Repositioning the vertical power cord manager

2. Slide the vertical power cord manager to the desired position.
3. Tighten the bolts.

The vertical power cord managers are optimized for 42U and 45U TeraFrame™ cabinets, and attach without adapter plates to the top and bottom of the frame. For 24U and 36U cabinets, use horizontal power strips, available from CPI.

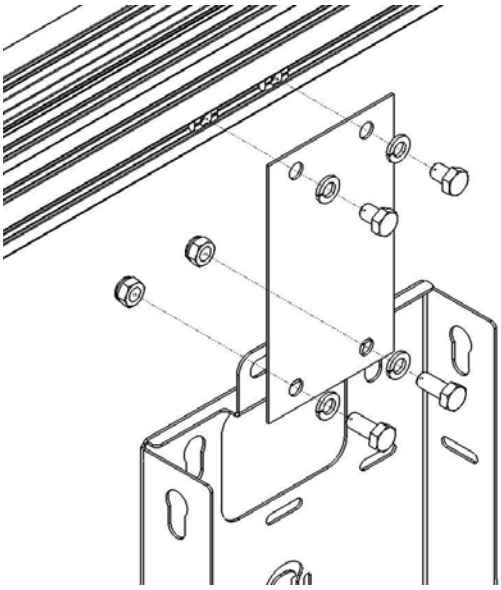


Fig. 3.3.1b Adapter plate attached to the bracket

NOTE: Other height cabinets require power strip bracket and adapters as described in the following chart.

Adapter plates

Cabinet height	Adapter plate size	Bracket height
43U	1U	42U
44U	2U	42U
46U	1U	45U
47U	2U	45U
48U	3U	45U
49U	4U	45U
50U	5U	45U
51U	6U	45U

3.3.2 Vertical power strip brackets

Vertical power strip brackets can be ordered for TeraFrame cabinets. These brackets support 66 inch vertical power strips in 42U to 47U TeraFrame cabinets.

The mounting brackets attach to the top and bottom of the cabinet frame. Shoulder standoffs (included with all standard CPI vertical power strips) attach to the power strip, then the standoffs "slot" into the keyholes in the power strip brackets.

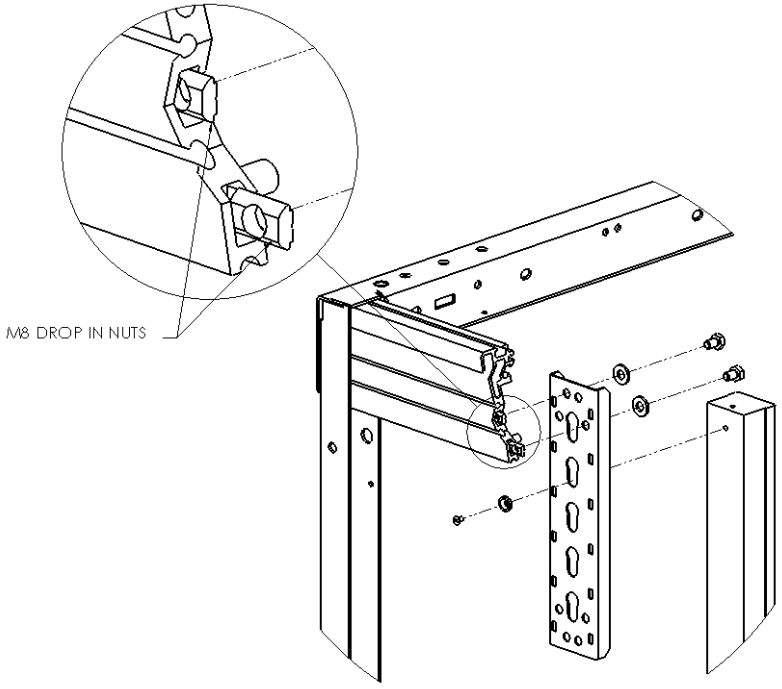


Fig. 3.3.2 Vertical power strip bracket

To install, follow the installation instructions supplied with the accessory.

3.3.3 Power strip mounting kit (non-CPI)

The optional power strip mounting kit (P/N 34407-C01) is used to attach non-CPI power strips or PDUs to the wide vertical power cord manager (34582-Series).

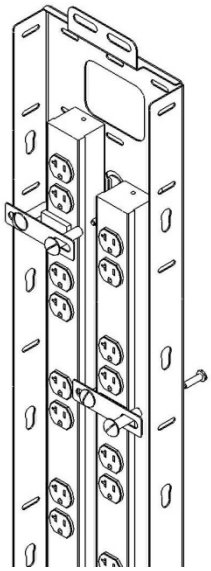
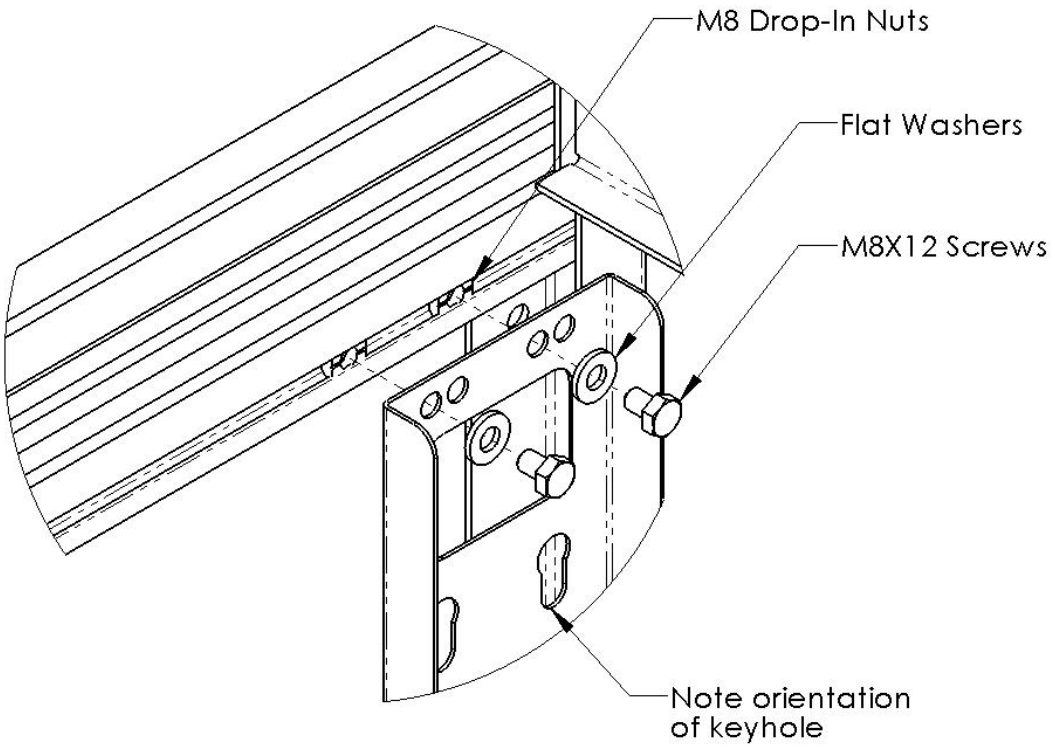


Fig. 3.3.3 Brackets securing non-CPI power strips

3.3.4 Dual/quad power managers

The optional dual power strip bracket holds up to two CPI 66 inch or 38 inch power strips.



3.3.4a Dual power strip bracket

The optional quad power strip bracket holds up to four CPI 66 inch or 38inch power strips. The offset provides space for the side panel attachment.

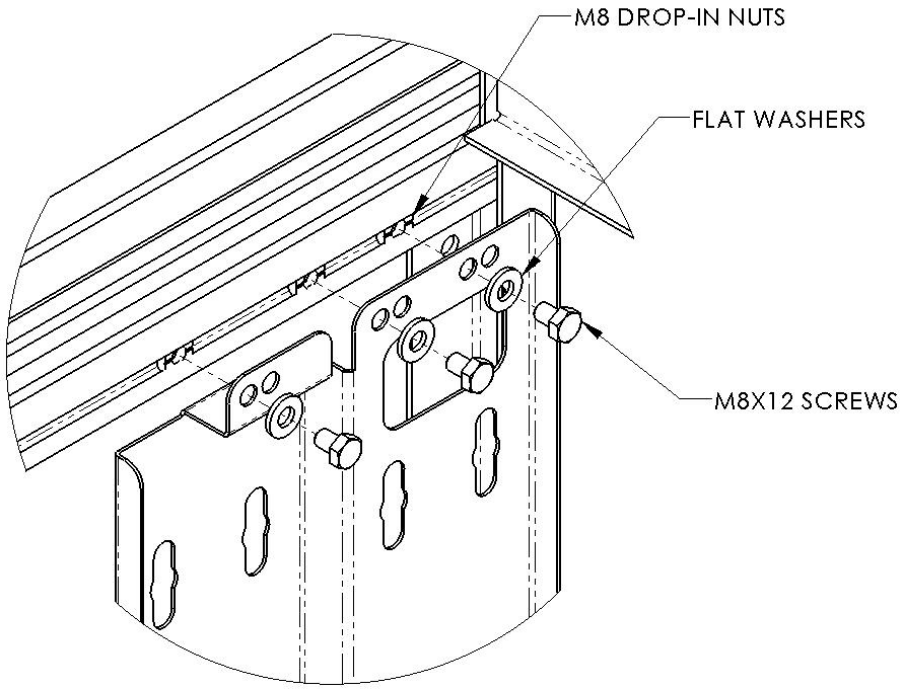


Fig. 3.3.4b Quad power strip bracket

3.4 ADDING/ADJUSTING THERMAL MANAGEMENT ACCESSORIES

Thermal management accessories for the TeraFrame cabinet include blowers, airflow baffles, air dams, air ducts, filler panels, and environmental monitors. Cabinet side panels can be installed to prevent hot air from escaping the side of the cabinet or from entering adjacent cabinets in a multi-cabinet bay.

3.4.1 Adjusting the ECS enclosure blower

NOTE: This accessory can be factory-installed in the cabinet/frame, or it can be purchased separately. If purchased separately, follow the installation instructions supplied with the accessory.

The ECS enclosure blower (P/N 12900-001) is installed in RMU space 2. On an access floor, the blower delivers cold plenum air to the cooling air intakes on the front of installed equipment. On a slab floor, the blower routes cooler air from the floor up to the equipment air intakes and can reduce cabinet hot spots up to 15 degrees F. Add-ons for the blower include a foam gasket kit, air intake filter, and a blower duct.

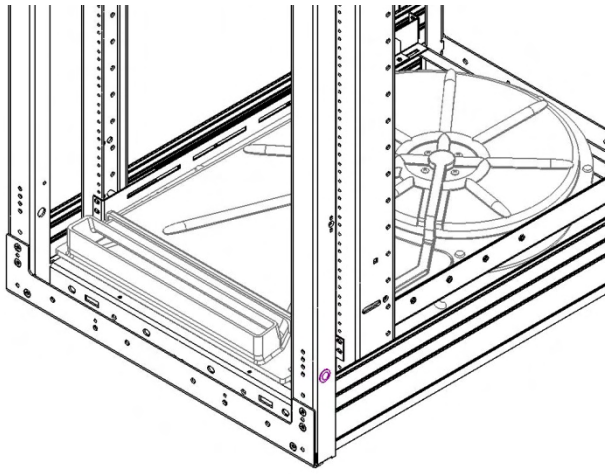


Fig. 3.4.1 ECS enclosure blower

If you move the vertical equipment mounting rails, the blower may need to be repositioned.

1. To reposition the blower, first unplug it from the power supply.
2. Loosen the thumbscrews on the blower bracket.
3. Reposition the blower so that cold air flows up in front of the equipment.
4. Secure the blower in the new position.

3.4.2 Installing the air dam kit

NOTE: This accessory can be factory-installed in the cabinet/frame, or it can be purchased separately. If purchased separately, follow the installation instructions supplied with the accessory.

The air dam divides the space around equipment within the cabinet into cool air space and hot air space. The space between the front door and the equipment (within the baffles) is cool air space. The space at the rear and along both sides of the cabinet is hot air space. The baffles prevent hot and cold air from mixing front-to-rear around the equipment, resulting in lower temperature air concentrated at the front of the equipment where it is needed most. Cool air is directed into the space in front of equipment to allow a higher volume of lower temperature air to pass directly through equipment.

The air dam kit (34522-Series) seals the space between the front door and equipment. The kit includes two side pieces, a top piece, a bottom piece, and

fasteners. To increase the benefits of the air dam, install a side panel between bayed cabinets and install filler panels on the front equipment mounting rails on all unused RMU spaces.

IMPORTANT: Perform tasks in the following order:

1. Remove the side panels.
2. Install the air dam.
3. Position the equipment mounting rails.
4. Add equipment to the cabinet.

Installing the air dam

1. Install the bottom air dam using the two provided screws.

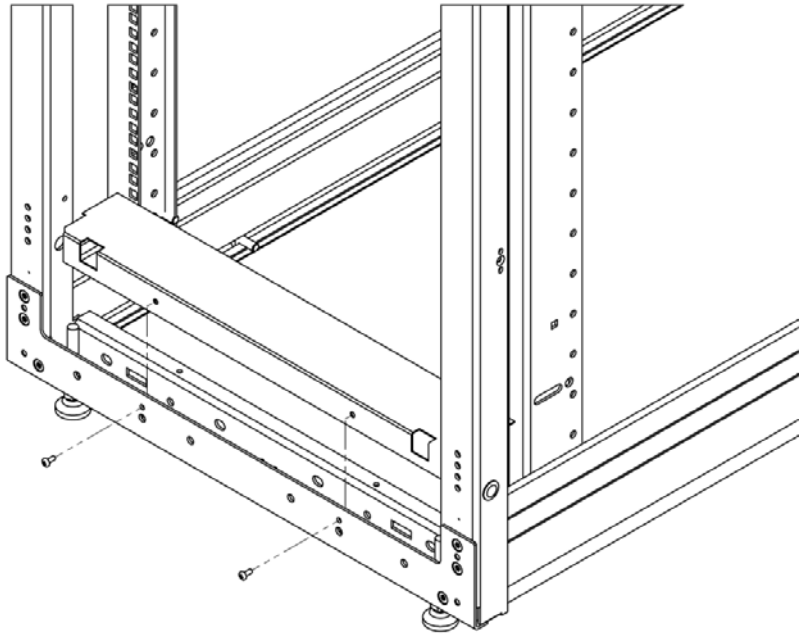


Fig. 3.4.2a Installing the bottom air dam

2. Install the top air dam using two provided screws. Position the part up as far as it will go.

3. Install the side air dams using four of the screws provided.

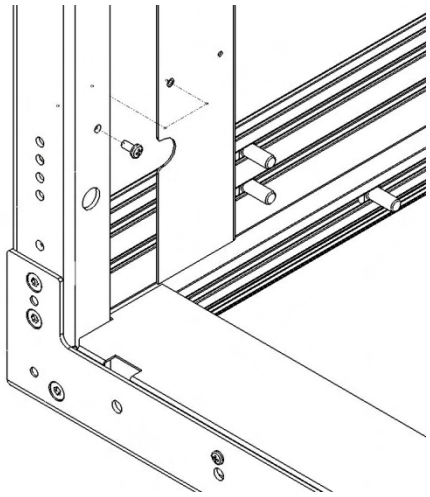


Fig. 3.4.2b Installing the side air dam

4. Position the front equipment mounting rails directly behind the air dam with the front face of the rails flush against the rear edge of the side air dam parts.
5. Loosen the screws that attach the top air dam part and slide it down as far as possible. Retighten the screws.

3.4.3 Internal air ducts

NOTE: This accessory can be factory-installed in the cabinet/frame, or it can be purchased separately. If purchased separately, follow the installation instructions supplied with the accessory.

The internal air ducts (34470-Series) are the best passive method for thermal management in access floor installations, as they require no maintenance and avoid the risks of fan malfunction.

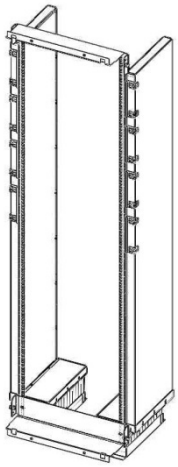


Fig. 3.4.3 - Internal air duct

The duct's floor box shroud slides down the floor box, so the shroud flanges seal around the tile cut-out. Slots in the flange allow you to screw the flange to the tile if desired. The air duct delivers the coldest air available up to higher areas in the cabinet, to eliminate hot spots.

3.4.4 Installing snap-in filler panels

NOTE: This accessory can be factory-installed in the cabinet/frame, or it can be purchased separately. If purchased separately, follow the installation instructions supplied with the accessory.

Install snap-in filler panels in unused cabinet RMU spaces to improve the functioning of hot and cold aisles. The panels prevent back-vented hot air from recirculating to the front of the cabinet.

Filler panels are available in plastic and in aluminum and come in various sizes. The figure below shows plastic 1 RMU and 2 RMU filler panels installed in the equipment mounting rails.

Press plastic filler panels (34537-Series for 1 RMU or 34538-Series for 2 RMU) into square-hole equipment mounting rails. The plastic panels do not fit drilled and tapped rails. To release the panels, pull straight out.

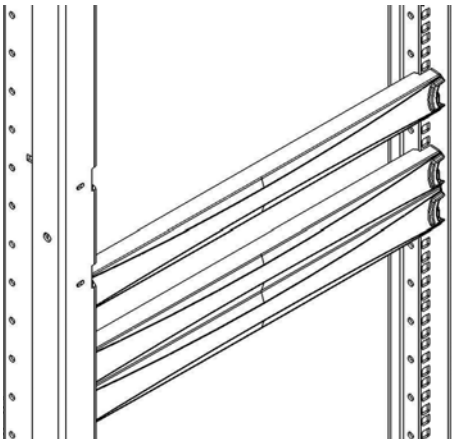


Fig. 3.4.4a Plastic filler panels

NOTE: For cabinets with drilled and tapped equipment mounting rails, use aluminum filler panels (30026-Series). These metal weight-bearing filler panels require screws for assembly and come in 1 to 12 RMU sizes.

3.4.5 Installing the vertical exhaust duct system

A Vertical Exhaust Duct System can be purchased with the cabinet/frame. In addition, each component (vertical exhaust duct, top panel, airflow director and rear door sealing kit) can be purchased separately.

The VED upgradable top panels are available for 600 mm and 700 mm width cabinets. Purchase series 35012-xxx panels for 600 mm applications or series 35013-xxx panels for 700 mm applications.

The Vertical Exhaust Duct is available in two heights to accommodate a specific range of height adjustment. Part number 34370-C00 adjusts between 20-34 inches; part number 34370-C01 adjusts between 34-60 inches high.

The Airflow Director can be purchased as part number 34570-C00 and the Rear Door Sealing Kit can be purchased as part number 34573-C00.

WARNING: Improper use of this product may lead to serious injury or death. Read and understand all instructions for proper installation and use of this product.

WARNING: Be sure to use sufficient personnel to safely assemble and install the exhaust duct.

NOTE: Install only in a restricted service environment, such as a data center. Use indoors only, in environmentally controlled areas; do not use outdoors, in harsh environments or in air-handling spaces. Allow only qualified service personnel to use this duct.

NOTE: When ordered as part of the factory-installed Vertical Exhaust Duct System, the vertical exhaust duct ships uninstalled in a separate carton with the cabinet. The instructions below explain installation.

3.4.5.1 Assemble the vertical exhaust duct

1. Remove the two flattened duct sections from the carton and expand them into the rectangular tube shape. Place both halves on the floor with the bent flanges on floor.
2. Slide the top section (has rubber seal around edge) down over the bottom section until it is resting on the floor.

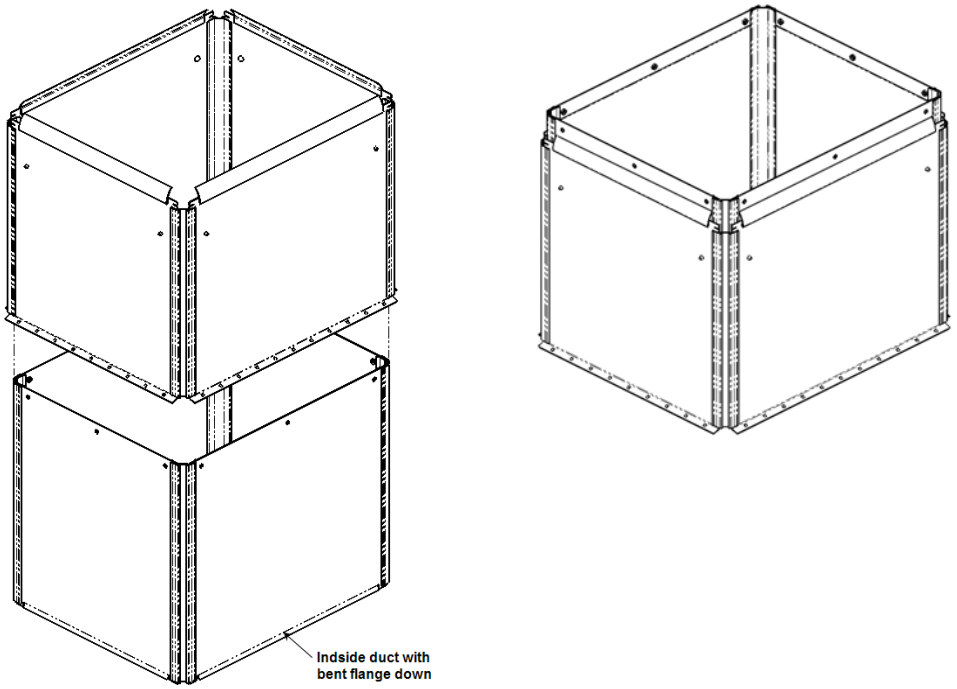


Fig. 3.4.5.1a Assembling the top and bottom halves of vertical exhaust duct

3. Slide one of the plastic seal caps down into the plastic corner of the outside duct as shown below. The spring tab on the inside of the cap fits into the corner slot. Slide the cap about halfway down the corner; it will be positioned later.

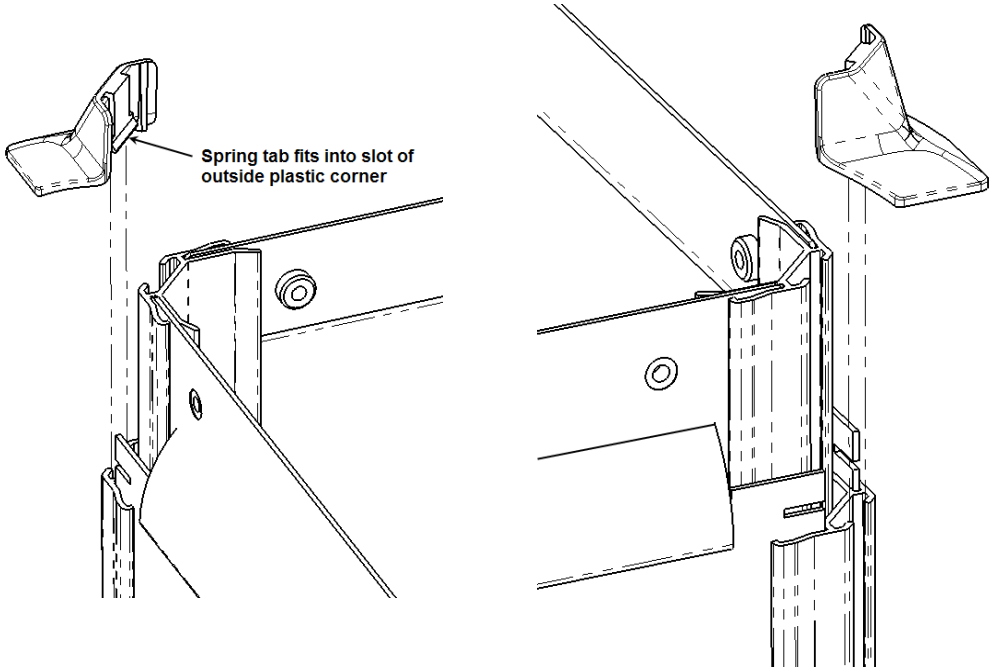


Fig. 3.4.5.1b. Installing a seal cap on vertical exhaust duct

4. Slide one of the corner lock plates down into the plastic corner slot of the inside duct. Install a plastic lock with the screw boss sliding onto the corner lock plate boss and the ribs on the inside of the lock sliding into the slots on the sheet metal panel. Install a 5mm x 16mm flat head screw through the hole in the lock and into the threaded boss on the lock plate and tighten.

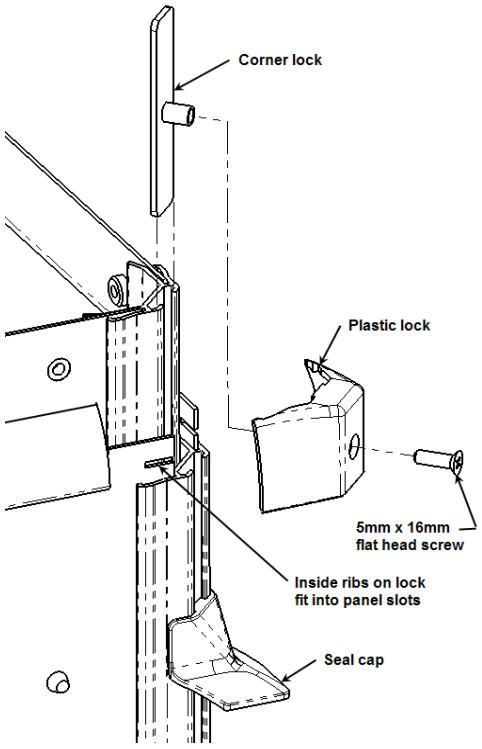


Fig. 3.4.5.1c Installing the corner lock on vertical exhaust duct

5. Repeat steps 3 and 4 for the other three corners.

6. Install a mounting bracket on each side of the inside duct with three 6mm x 12mm screws. The picture below shows the brackets installed for mounting the duct on a 600mm wide cabinet; for 700mm cabinets install the shorter bracket on the other two sides.

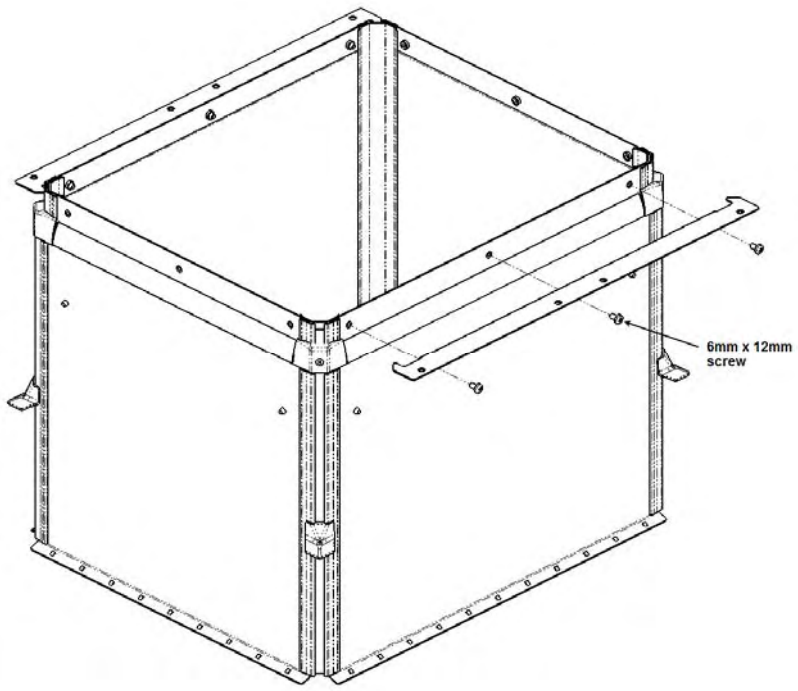


Fig. 3.4.5.1d Installing mounting brackets on vertical exhaust duct

7. Turn the assembly over.

8. Install the four sealing strips onto the bent flange on the outside duct. The strips simply push onto the flanges.

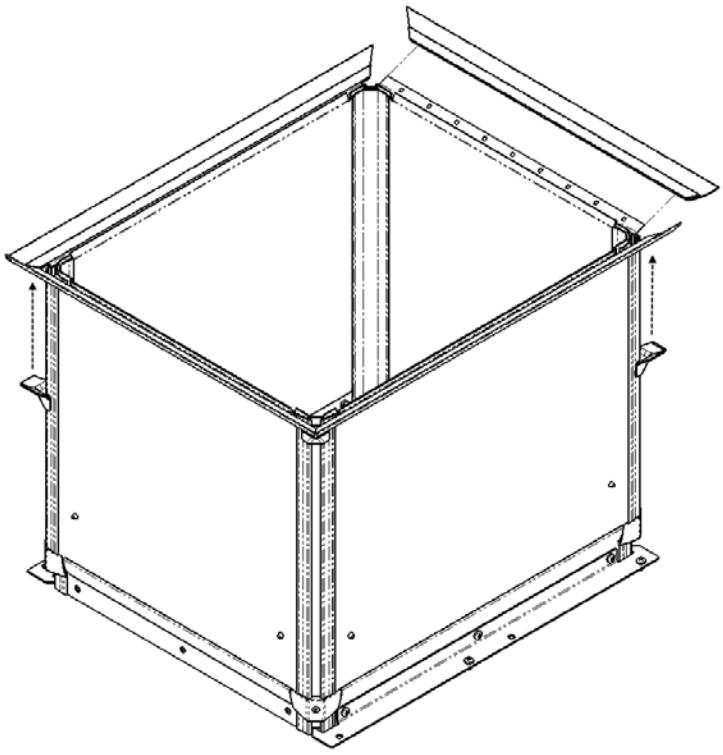


Fig. 3.4.5.1e Attaching sealing strips to the vertical exhaust duct

9. Slide the four seal caps up against the sealing strips.

3.4.5.2 Remove the knockout panel on the server top panel

CAUTION: Knockout panel may cause injury if it is dropped during removal from the top panel. If possible the top panel should be removed from the cabinet prior to removing the knockout panel. If the top panel cannot be removed due to cables routed through openings please follow the knockout removal instructions carefully.

NOTE: When the Vertical Exhaust Duct System is ordered with the cabinet, the cabinet will deliver with the top panel installed. If the top panel is not installed, see Section 2.7 instructions.

NOTE: There is a large rectangular knockout panel at the back of the top panel that must be removed to allow airflow through the top panel and into the vertical exhaust duct.

1. Insert the blade of a flat bladed screwdriver into a rectangular opening along the edge of the knockout panel. Force the knockout panel upward with a prying action until it breaks loose; DO NOT PRY THE PANEL DOWNWARD AS THIS COULD CAUSE THE PANEL TO FALL OUT. NEVER REMOVE THE PANEL FROM INSIDE OF THE CABINET.

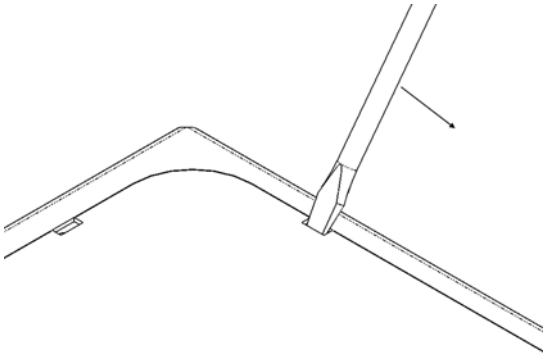


Fig. 3.4.5.2a Removing the knockout panel

2. Repeat step 1 for each screwdriver opening in the following order:
   - Do all the openings along one side.
   - Do all the openings on the opposite side.
   - Next do the openings on the third side being careful not to let the panel fall down.
   - When the last opening is broken, lift the panel upward and grasp it with your hands. Continue to raise the panel, it will hinge on the edge that is still attached, until it breaks loose.

3.4.5.3 Attach the vertical exhaust duct to cabinet frame

WARNING: To avoid injury use two people to lift the duct assembly.

1. Insert four M8 drop-in nuts into the upward-facing slide track on the cabinet frame, two on each side.

2. Set the exhaust duct assembly on the cabinet with the duct mounting angles resting on the cabinet frame side members.
3. Install four M8 x 12 hex bolts with washers through the mounting flange holes into the M8 drop-in nuts.

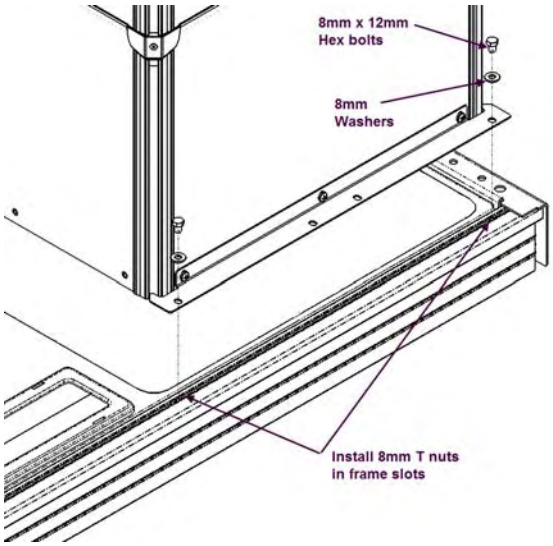


Fig. 3.4.5.3a Installing the vertical exhaust duct

4. Loosen the three mounting angle screws as needed to match the height of the duct bottom edge with the top panel surface.
5. Adjust the height of the duct by loosening the four lock screws (one per corner) and sliding the top duct up until the rubber seal makes contact with the bottom of the ceiling tile. Tighten the four lock screws. This step should be performed with two people.

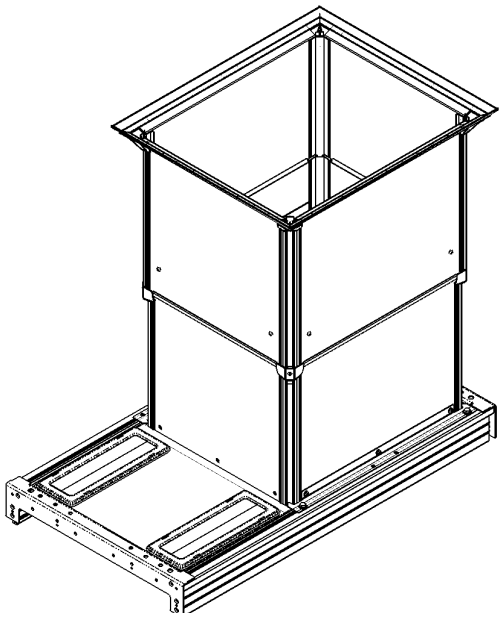


Fig. 3.4.5.3b Vertical exhaust duct attached to the top of the cabinet

6. Mark, remove, trim and replace the ceiling tiles so that air can flow into the plenum space above the drop ceiling.

3.4.6 Installing the air flow director

NOTE: This accessory can be factory-installed on the cabinet/frame, or it can be purchased separately. If purchased separately, follow the installation instructions supplied with the accessory.

Install the air flow director (P/N 34570-C00) at the rear of the inside bottom of the frame.

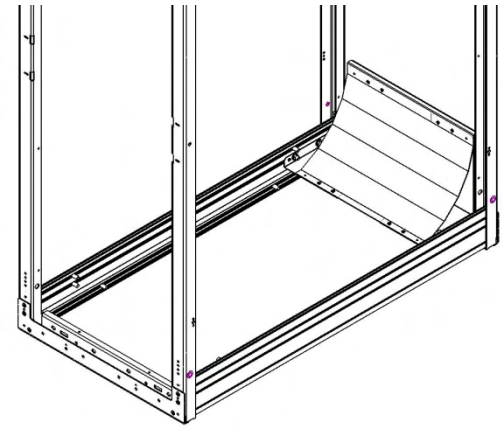


Fig. 3.4.6a Air flow director in the 600mm cabinet

Attach the air flow director to the bottom side frame members using two M8 X 12 hex bolts, washers, and drop-in nuts in the middle inward-facing slide track on each side.

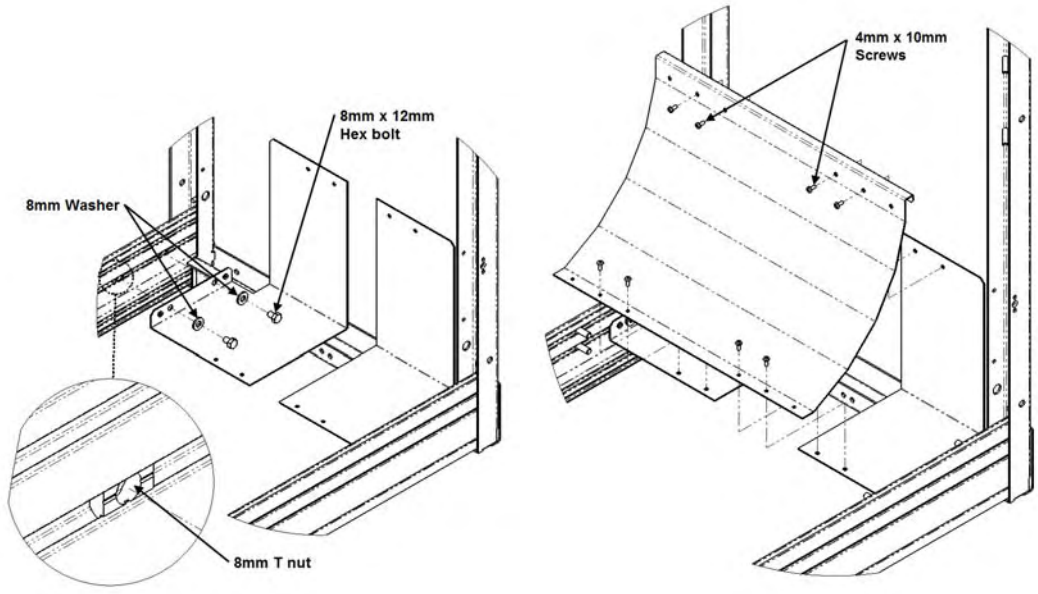


Fig. 3.4.6b Attaching the air flow director

Though the air flow director is configured for 600 mm wide cabinets, it can be mounted in 700 mm wide cabinets by moving the end brackets outward. Remove the four screws in each bracket, move the bracket out, and reinstall the screws.

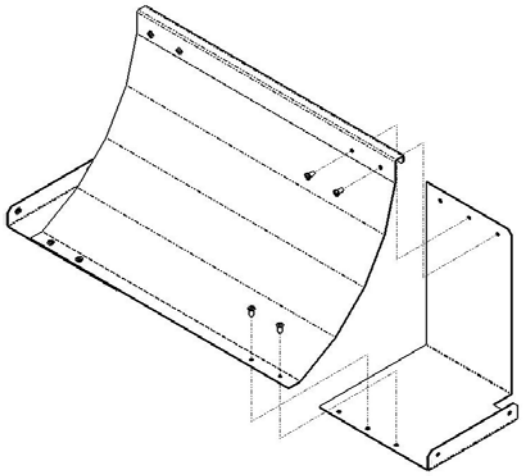


Fig. 3.4.6c Air flow director with adjustable end bracket

3.4.7 Installing the rear door seals

NOTE: This accessory can be factory-installed on the cabinet/frame, or it can be purchased separately. If purchased separately, follow the installation instructions supplied with the accessory.

NOTE: The rear door seal kit (P/N 34573-000) includes a large and small adhesive-backed seal. Be sure to apply seals to the correct location on the door.

1. Apply the large seal to the top of the square tubing.

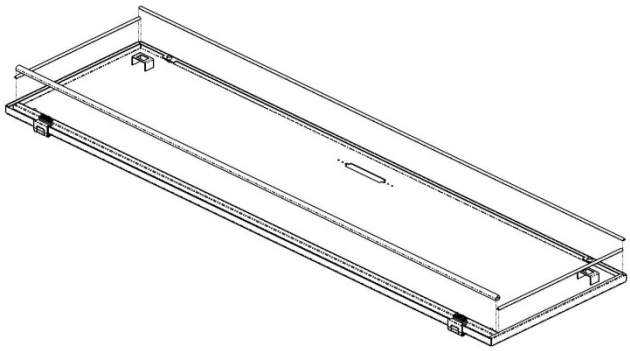


Fig. 3.4.7a Large rear door seals

2. Mount the smaller seal material to the top, bottom, and side flange on the lock side of the door.

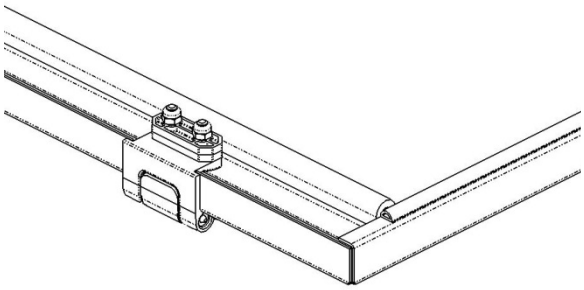


Fig. 3.4.7b Smaller rear door seals

3.5 SECURING EQUIPMENT TO THE EQUIPMENT MOUNTING RAILS

The TeraFrame cabinet supports all manufacturers' equipment that conforms to the EIA-310D standard. Most equipment attaches directly to the equipment mounting rails; however, some manufacturers may provide brackets or slide assemblies that require additional installation.

WARNING: The TeraFrame cabinet can support many system configurations. The amount of force required to tip or make the cabinet unstable differs with each configuration. Be sure to read and follow your equipment manufacturer's specific assembly, installation, and safety instructions.

3.5.1 Positioning equipment by RMU marks

The vertical equipment mounting rails are adjustable front to rear, maximizing the flexibility of the TeraFrame cabinet (see section 3.1.1).

RMU marks are clearly printed on the equipment mounting rails to simplify installation of components, thus saving time and minimizing errors. Align equipment with the RMU marks on each side of the frame before securing the equipment.

The TeraFrame cabinet is provided with hardware to secure equipment to the mounting rails. Cabinets shipped with tapped rails include 50 each #12-24x5/8 screws. Cabinets shipped with square-punched rails include 25 sets of M6 cage nuts and screws. Additional hardware is available for purchase (see section 1.5).

3.6 DRESSING CABLES AND ATTACHING EQUIPMENT TO POWER

CPI cable management products provide the proper cable bend radii for better data transmission; fewer tangled cords and cable damage; and ease in moving, adding, and changing connections. The products assist in complying with ANSI/TIA/EIA installation of Category 5/5e/6/6a and fiber cables.

3.6.1 Bundling cables

Separate the cables by type, gather into bundles, and fasten loosely with hook and loop fasteners. CPI offers Saf-T-Grip Reusable Cable Management Straps to fasten cable bundles (P/N 0200X-series).

Fig. 3.6.1 Bundled power cables

Arrange the cable bundles horizontally on cable pathways under an access floor or above the cabinets. Do not fill the cable pathway more than 6 inches deep.

3.6.2 Maintaining the proper radius bends

Use radius drops (P/N 12100-series and 12101-series) to maintain the proper 1.5-inch radius bend in the cable bundles. Position a radius drop where cable enters or exits the pathway to maintain a gradual bend in the cable. Installation instructions are included with the radius bend service kit.

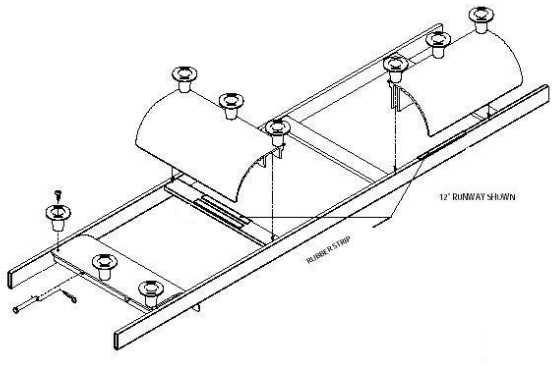


Fig. 3.6.2 Radius bends

3.7 ENVIRONMENTAL MONITORING

The RIM-600 (remote infrastructure management) system enables comprehensive monitoring of critical environmental conditions such as temperature, humidity, smoke, sound level, motion, water, intrusion, and power outages. When a sensor exceeds or drops below the threshold you configure—high temperature, for example—RIM-600 notifies you about the condition. You can also call into the RIM-600 system to obtain status information about your infrastructure.

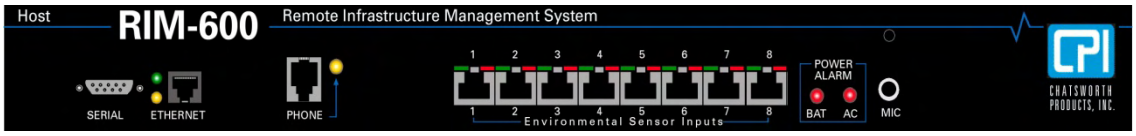


Fig. 3.7 RIM-600 host

See the Chatsworth RIM-600 Installation Manual for complete installation, configuration, and maintenance instructions (www.chatsworth.com/rim600). This manual includes the instructions and commands necessary to install and program the RIM-600. Additional summary and application chapters are included to help you speed programming and to understand RIM-600's features. Read this manual thoroughly to establish a basic understanding of the system, and keep the manual as a reference. Especially observe all warnings and cautions in the manual.

Each RIM-600 Host monitors up to eight environmental conditions via sensors that you attach. Each unit contains its own internal battery to ensure that power failures will not prevent the RIM-600 Host from sending the message that your infrastructure is in trouble.

Full event-history and trending are provided with the RIM-600 Data Logging feature. User-selectable sampling lets you store critical temperature, humidity, or other environmental information about your infrastructure by the minute, hour, or day.

Stand-alone solution

The RIM-600 can act as a stand-alone infrastructure monitoring system in a simple-to-install, 1U high, rack-mountable package.

Network solution

The RIM-600 is scalable for networks of all sizes and complexities. It can expand along with the infrastructure, without the need for additional technology investment.

3.7.1 Locating the sensors

Decide where you want a sensor to be located. Attach a standard patch cable, plug it into your patch panel, and do the same in your server room to connect your sensor to the RIM-600 system. See "Chapter 7, RIM-600 Sensors," in the Chatsworth RIM-600 Installation Manual.

NOTE: CPI suggests placing one mini-temperature sensor inside the cabinet near the air intake of the server mounted highest in the cabinet.