

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.

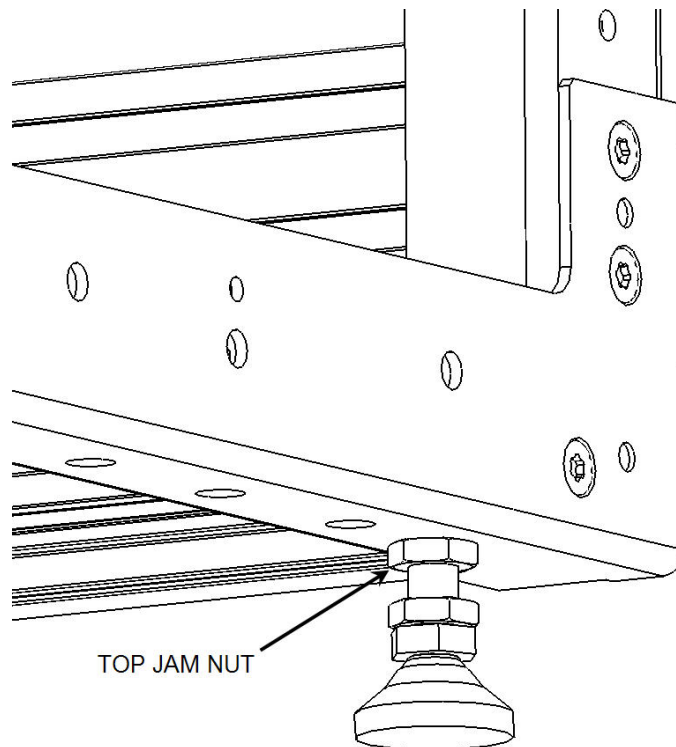


Fig. 1.5.1 Adjusting leveling feet

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

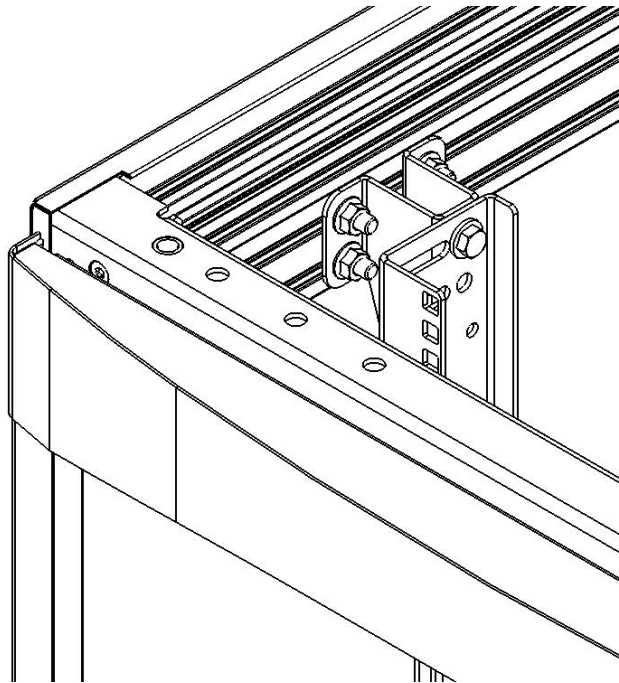


Fig. 1.6.1a Front-to-back slide tracks

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.

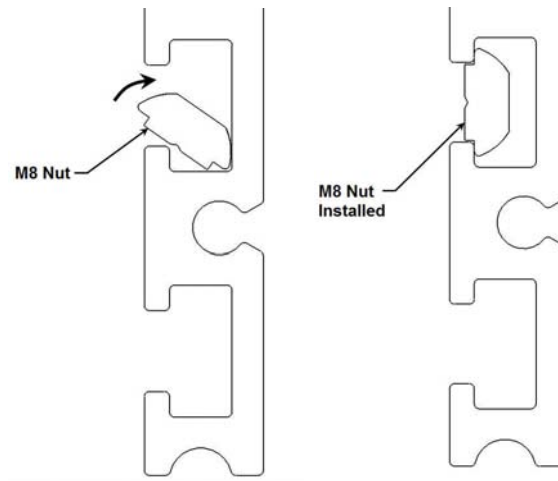


Fig. 1.6.1b Placing drop-in nuts in slide track

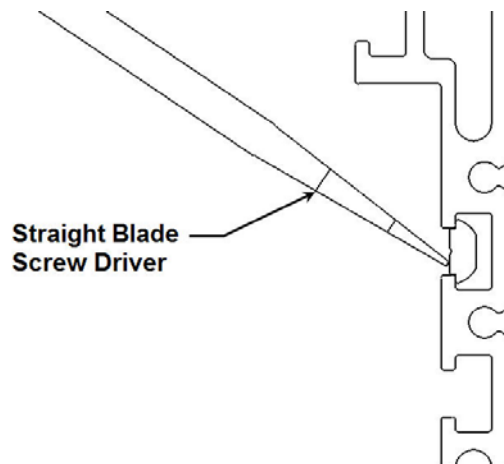


Fig. 1.6.1c Use screwdriver for placing drop-in nut in slide track

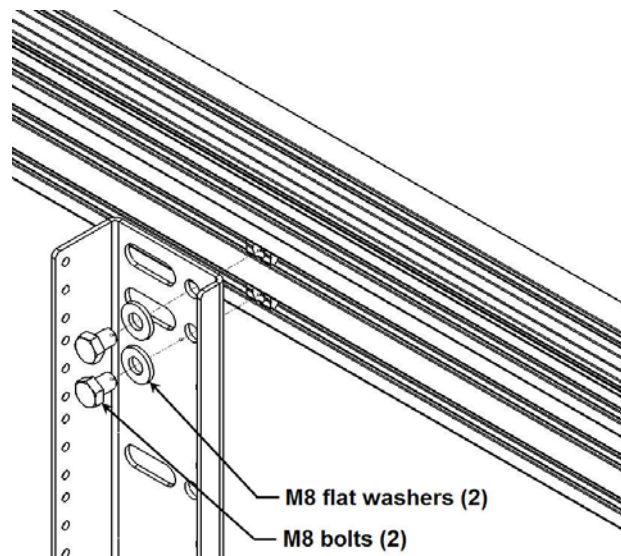


Fig. 1.6.1d Fastening M8 bolts to drop-in nuts

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.

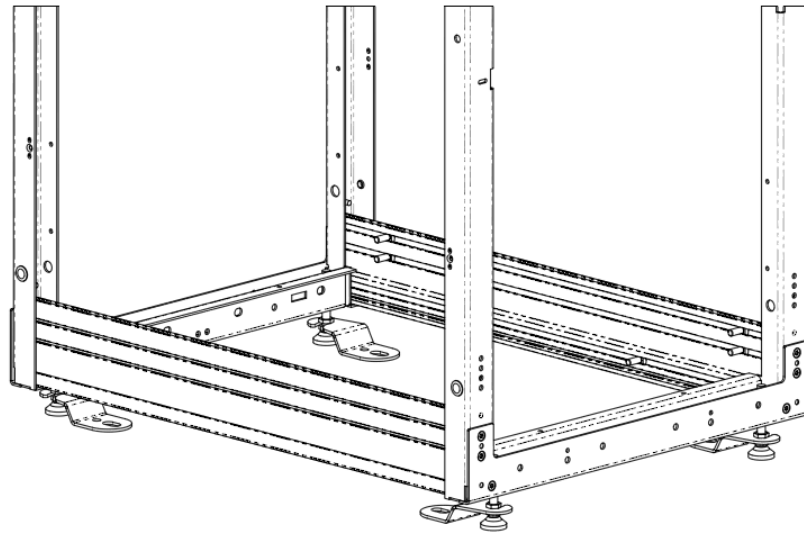


Fig. 1.6.2a Positioning floor anchor brackets

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.

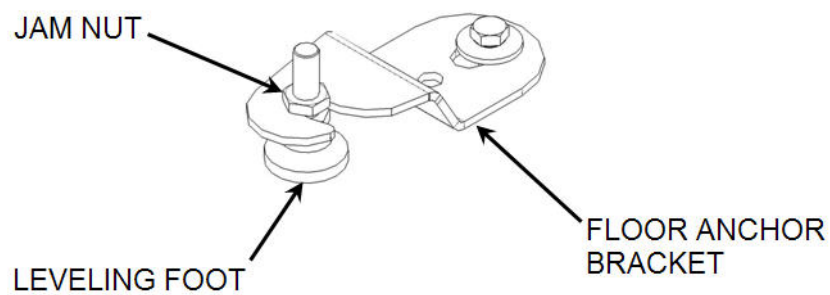


Fig. 1.6.2b Floor anchor brackets with leveling foot

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

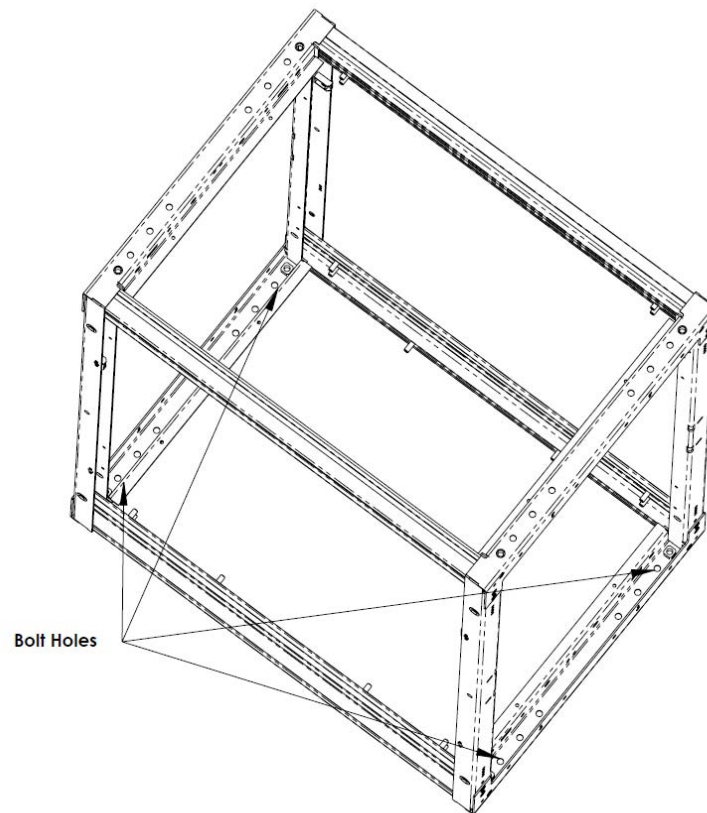


Fig. 1.6.2c Frame bolt down

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.

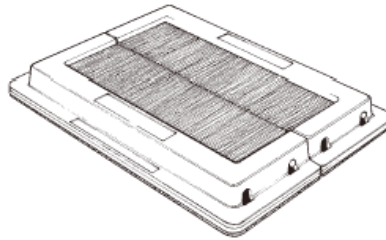
- An air dam blocks air recirculation.
- Integrated cold air distribution ducts convey cold air from the underfloor plenum directly to the front of equipment in the cabinet.
- Filler panels block hot air recirculation.
- CPI Koldlok floor sealing solutions eliminate bypass air flow.
- A foam gasket kit 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.