



Access Server Rack Cabinet Compatibility Guide

*A Guide to the Selection and Evaluation of Access Server Rack
Cabinets for Compatibility and Use with
Third Party Server Chassis*



Kalkenstraat 91-93 B-8800 Roeselare (Roulers) - Belgium

Tel. +32(0)51/25.06.10 Fax +32(0)51/24.02.57

Email: edp@eldeco.be website: www.rack19.be or www.eldeco.be or www.eldeco-edp.eu



Contents

Page	
2	Disclaimer
3	Purpose/Overview/Definitions
4	Slide Rail Assembly
5	Rack Types
6	Mounting Angle Dimensions
7	Mounting Angle Holes
8	Mounting Angle Clearance
9	Rack Depth
10	Clearance for Chassis Handles
11	Thermal Management
12	Thermal Guidelines
13	Air Flow Requirements
14	Web Links



Disclaimer

THE DATA IN THIS DOCUMENT IS PROVIDED FOR REFERENCE PURPOSES ONLY, WITH NO WARRANTIES WHATSOEVER, INCLUDING ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE, OR ANY WARRANTY OTHERWISE ARISING OUT OF ANY PROPOSAL, SPECIFICATION, OR SAMPLE.

Information in this document is provided in connection with the Cooper B Line Access Cabinet Range. No license, express or implied, or otherwise, to any intellectual property rights is granted by this document. Cooper B Line assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Third Party products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright or other intellectual property right.

Cooper B Line reserves the right to make changes to its published specifications at any time, without notice.

The hardware vendor remains solely responsible for the design, sale and functionality of its product, including any liability arising from product infringement or product warranty.

Cooper B line does not endorse or represent any other company or their products named in this document. The information is provided solely for the readers' convenience, however, the reader remains solely responsible for the design, sale and functionality of its product.



Kalkenstraat 91-93 B-8800 Roeselare (Roulers) - Belgium

Tel. +32(0)51/25.06.10 Fax +32(0)51/24.02.57

Email: edp@eldeco.be website: www.rack19.be or www.eldeco.be or www.eldeco-edp.eu



1 Purpose

This Server Rack Cabinet Compatibility Guide is intended to provide guidance and clarification to both customers and Independent Hardware Vendors who seek compatibility with The Access cabinet range. This document provides a checklist and explanation of the critical Access server rack cabinet attributes that are required for full compatibility with Third party server chassis and related accessory kits.

2 Overview

This specification was created to address the following major areas:

1. Introduction to the EIA-310-D enclosure specification
2. Critical rack cabinet dimensions and features
3. Thermal cooling considerations

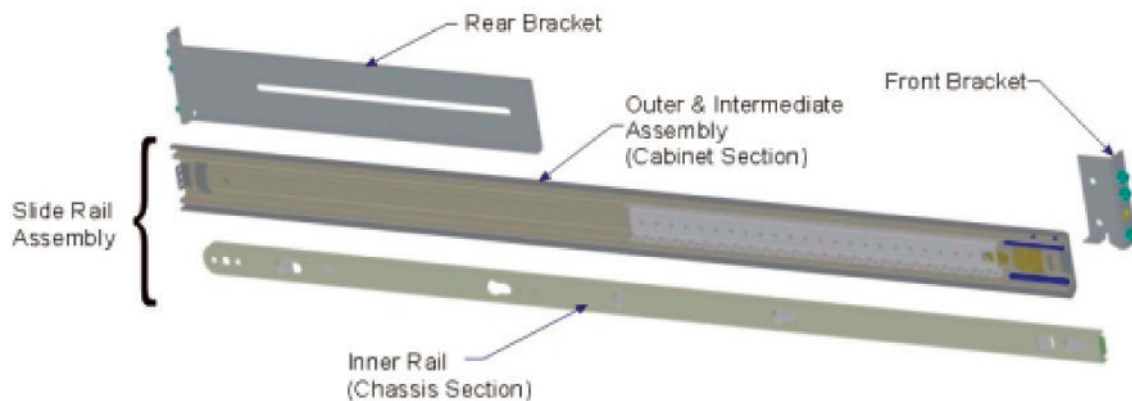
3 Terms/Definitions:

Term	Definition
Bezel	Aesthetic plastic or metal front-facing cover of a typical computer server.
Access cabinet	A freestanding and self-supporting 4-post enclosure for housing electrical and/or electronic equipment. Usually fitted with access doors and/or side panels, which are removable. Also typical of the telecommunications industry in EMEA.
CFM	Cubic Feet per Minute. Measure of Volumetric Airflow.
Chassis	A mechanical structure designed specifically to support associated electrical and electronic components.
EIA 310-D Mounting Angle	The front internal mounting surface within a Cabinet Enclosure or Rack that provides a mounting surface for Computer Servers, electrical equipment, chassis guides, slide rails, and/or panels.
Rack	An open-air structure for mounting electrical or electronic equipment. A Rack is an open Cabinet. There are 2 basic types of Racks, 2-post & 4-post. 2-post racks are typical of the telecommunications industry in the USA.
Rear Mounting	The rear internal mounting surface within a Cabinet Enclosure or Rack which provides a mounting surface for computer servers, electrical equipment, chassis guides, and/or slide rails.
Slide Rails	Devices to Support Retractable (Telescopic) Sub-racks and Chassis in the Extended Position.
U	Equal to 1.75 inches (44.45 millimeters)

General

This guide intends to clarify the critical compatibility issues between Third Party server chassis and The Access server rack cabinet. All system design considerations in this document are based upon a 19-inch rack configuration only as defined in the Electronic Industries Association, EIA, 310-D Standard. The predominate dimensional unit of length for this guide is noted in millimeters followed by inches: 25.4mm [1.00 inches].

Typical Slide Rail Assembly

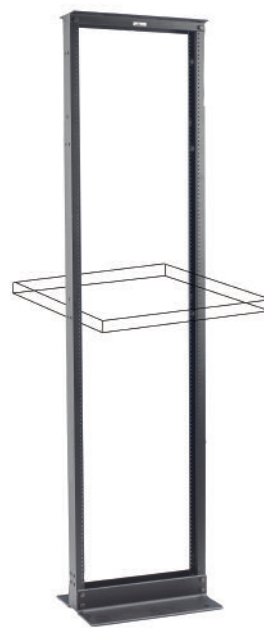




Access Rack Cabinets/2 Post Rack



4-POST "Enclosed" rack
(shown without front doors)



2-POST "open air" rack

The Access Rack is Compliant with the EIA-310-D Standard

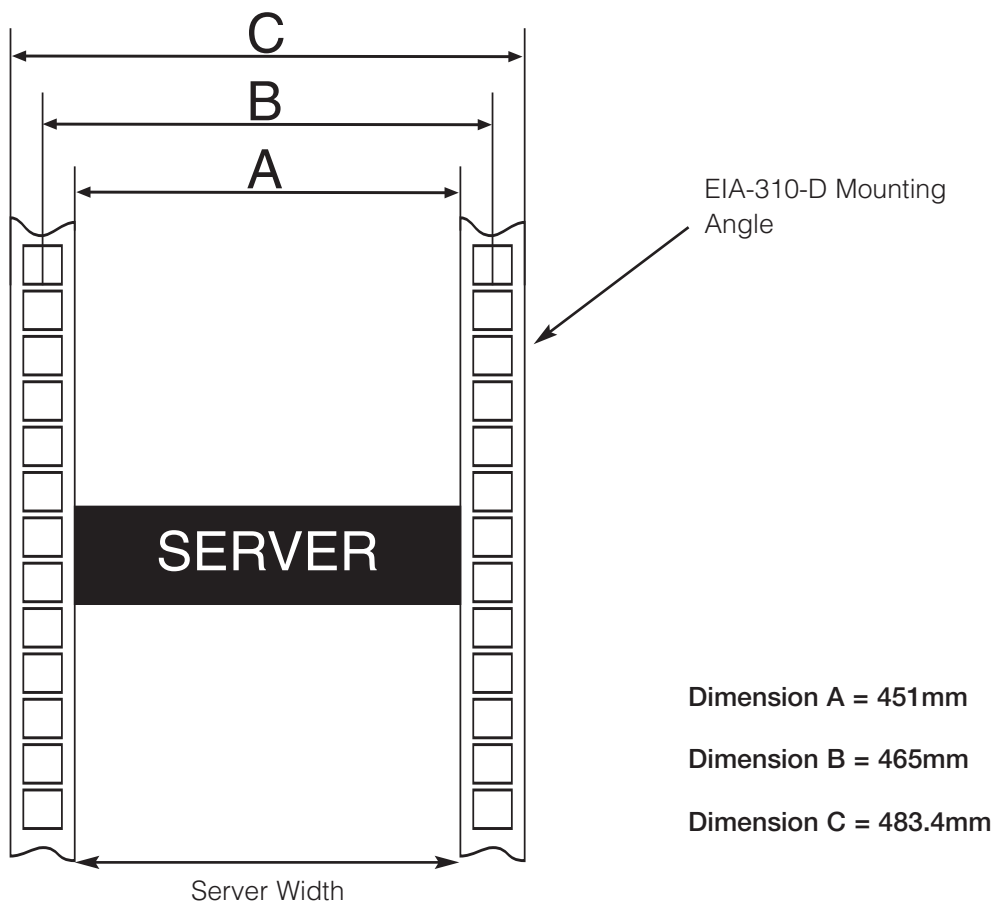
The Electronic Industries Association (EIA) created the EIA-310-D standard in 1992 for cabinets, racks, panels, and associated equipment. Third Party server chassis manufacturers that are compatible with the EIA-310-D specifications are also compatible with The Access Cabinet Range.

NOTE

Not all server rack cabinets are built to EIA-310-D specifications, so be sure and ask. Your server chassis and associated accessory rail kit may not install successfully in a server rack cabinet that is not EIA-310-D compliant.

Mounting Angle Dimensions

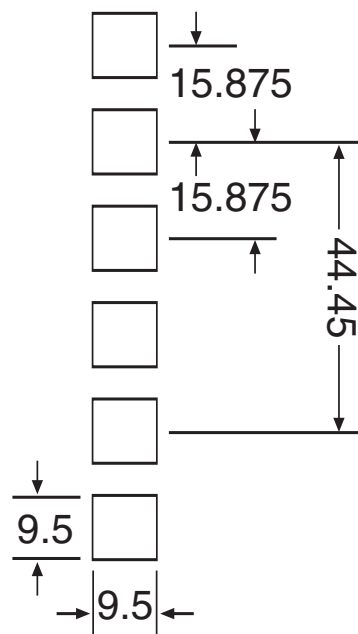
The EIA-310-D specification addresses form, fit, and function for system spacing, mounting, and bezel clearance.



Mounting Angle Dimensions

Mounting Angle Holes

The EIA-310-D standard also specifies the placement of the mounting holes in the mounting angle.



Square mounting holes

NOTE

While EIA-310-D allows the mounting flange holes to be round, square, or tapped (threaded), Access cabinets are supplied with Square holes. Most OEM server Chassis manufacturers work best with square holes

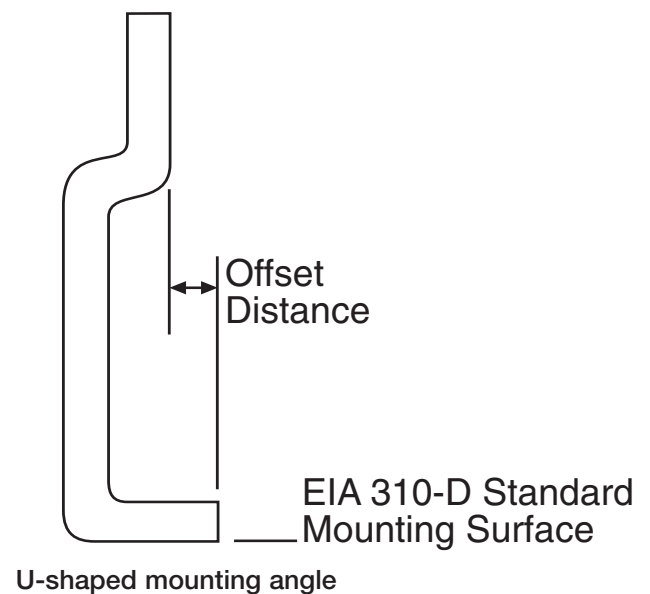


Mounting Angle Clearance

The EIA-310-D standard does not address the issue of “rack angle clearance”. Many vendor racks ship with an EIA Mounting Angle that is U-Shaped.

NOTE

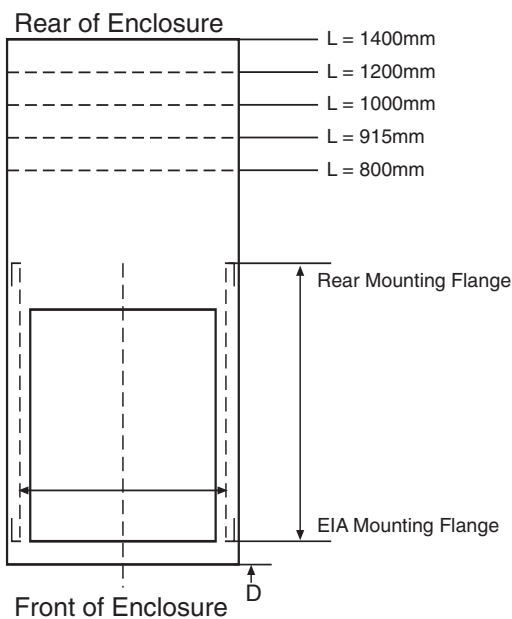
The diagram opposite shows a U-shaped EIA Mounting angle. Often, the “offset distance” is less than 16.77mm (15mm is typical). The Access Cabinet provides 22mm worth of space for the slide rail assembly.



Rack Depth

Selecting a server rack cabinet with the proper depth is essential. It's important to consider the length of the server chassis as well as additional room in the rear for cable management and clearance in the front for the chassis bezel and handles/pulls. Typically server chassis are designed to fit into racks that are 900mm – 1000mm deep. While some chassis may be mountable in 800mm cabinets, they may extend out the back of the cabinet and prevent the enclosure doors from closing properly.

It's important to remember that you will need space behind the server for cables. Fiber optic cables require ~152mm (6") while standard ethernet and power cables may get by with only 112mm (4") of clearance.



Top view of Access cabinet depth

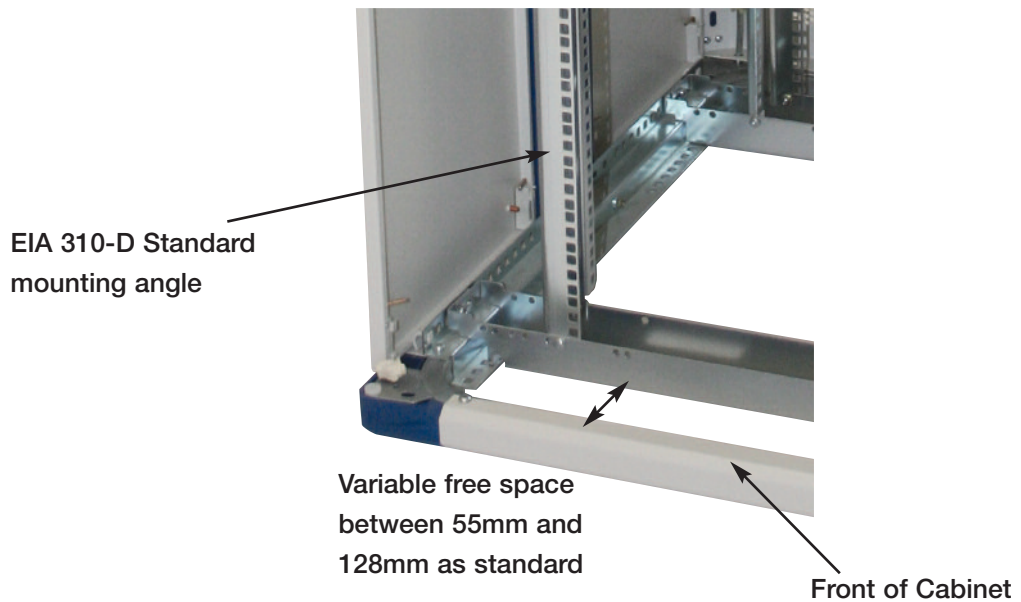
The Majority of server chassis do not ship with cable management arms or other adapters. Cooper B Line provide cable management systems, you should consult with your representative directly regarding your particular requirements.

Also note that dimension "D" is set to a standard configuration of 128mm of free space between the EIA Mounting Flange and inside of the enclosure door. This space is normally required for clearance on the bezel and pull handles on the front of the server chassis.

This space can be adjusted by movement of the mounting angles within the Access rack.

Clearance for chassis pull handles

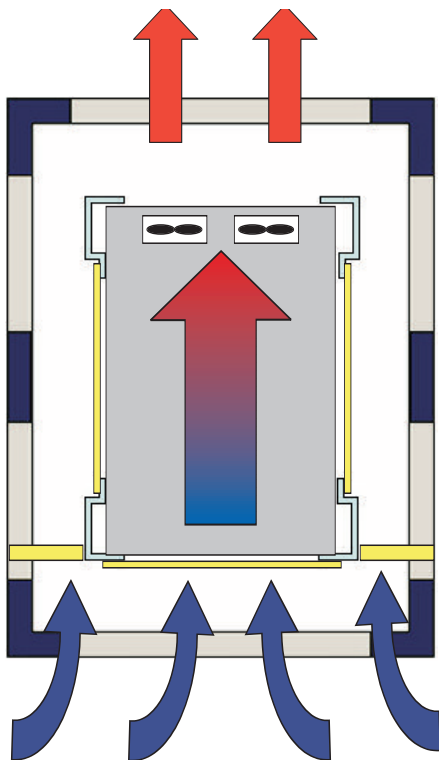
Third party server vendors require a minimum distance between the front of the EIA Mounting Flange and the inside of the front enclosure door. This clearance allows room for the chassis pull handles and bezel as well as air circulation through the cabinet.



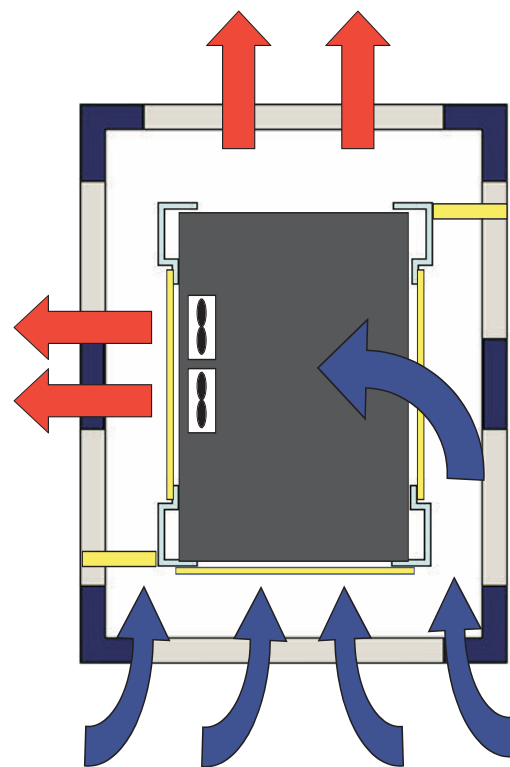
Clearance for chassis pull handles

Thermal/Airflow

Most rack-ready servers today require front-to-back cooling. It is required, therefore, that enclosed cabinets provide front-to-back cooling as well. As the server thermal loads increase due to new technology, the cooling capability of the enclosed cabinet needs to scale as well.



Typical back to front configuration



Panels blank off front to rear between the 19" mounting angles leaving gaps where the switches are mounted leaving a left to right airflow configuration

Fan packs, which force ambient air from the front of the cabinet through the back of the cabinet enclosure, aid the internal computer system fans in removing heat from the cabinet enclosure.



Enclosure Front and Rear Doors

The absence of access doors maximizes the volume of airflow into the cabinet. The need for secure enclosures, however, makes this unrealistic in some cases. Therefore, access doors need to be able to provide security and maximum allowable airflow at the same time. For maximum system cooling, the actual airflow CFM per “U” should be maximised. Recommended airflow ranges are listed below.

Total System Volumetric Airflow per “U”	
1U	32 – 36 CFM / U
2U	39 – 45 CFM / U
4U	38 – 40 CFM / U
5U	45 – 50 CFM / U
7U	25 – 43 CFM / U

Values based on Historical Source Product Data

Maximum system volumetric airflow requirements

In order to achieve these rates of CFM, both the front and rear doors need approximately 63% open-area perforations (holes). This percentage refers to the ratio of open space, by way of holes or slots, to un-open area within an airflow inlet or outlet. This is commonly referred to as the Free Area Ratio, or FAR.

A quick way to check the free area ratio is to count the number of holes in an area that is 25mm square (1 square inch). 63% FAR translates into approximately 33 holes in an area that is 25mm square. Cooper B Line Exceed this specification and can provide an open area door of up to 80%

While some racks have fans mounted on the top of the enclosure, it’s better to have them mounted directly to the rear door so the air is pulled through the chassis from front to back.

NOTE

As a guide server chassis are designed to operate within a range of 10°C - 35°C room ambient temperatures. In general, cooler is better, so 25°C - 30°C is suggested. The ideal method for cooling servers is to control the room ambient temperature and use rack cabinet doors that have a 63% or more higher Free Air Ratio. Under these conditions, additional fan packs on the rack cabinet are usually not necessary.



*Ashrae Standards

Thermal guidelines for data processing environments TC9.9

Allowable temperature range	15-32°C
Recommended range	20-25°C
Humidity range	20-80% RH
Recommended range	40-55% RH

* American Society of Heating, Refrigeration and Air-conditioning Engineers Inc



Related Documents and Information

ATX Specification, <http://www.formfactors.org/>

Electronic Industries Association Standard, EIA, ANSI/EIA-310-D-1992, <http://www.eia.org/>

Entry-level Electronics-Bay Specification, a Server System Infrastructure (SSI) Specification for Entry Servers, <http://www.ssiforum.org/>

Server System Infrastructure, SSI, Web site: <http://www.ssiforum.org/>

The Uptime Institute, <http://www.uptime.com/TUI/pages/tuihome.html>

Thin Server Power Supply, TPS, <http://www.ssiforum.org/>

Microsoft Windows NT Server Design Guide, <http://www.microsoft.com/hwdev/serverdg.htm>



Kalkenstraat 91-93 B-8800 Roeselare (Roulers) - Belgium

Tel. +32(0)51/25.06.10 Fax +32(0)51/24.02.57

Email: edp@eldeco.be website: www.rack19.be or www.eldeco.be or www.eldeco-edp.eu