Dell PowerEdge 2420, 4220, and 4820 Rack Enclosures

Technical Guide

4820D   4820W   4220D   4220W   4820   4220   2420

An expanded portfolio of rack enclosures designed to meet the requirements of your data center today and tomorrow.

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1 System overview

Introduction

The Dell™ PowerEdge™ rack enclosures are designed to hold and protect server, network and data storage equipment. The Dell rack is a sturdy, practical design and solidly built, delivered with Enterprise service, support and reliability. The Dell PowerEdge rack enclosures are offered in three height options: 24U (2420), 42U (4220), and 48U (4820); each of these racks is available in the standard 600mm x 1070mm dimensions, to fit within a two-tile floor plan layout.

Dell has introduced both wide and deep versions of the PowerEdge rack enclosures to address specific market requirements for additional space for power and cable management. The 42U and 48U heights are available in the wide form factor, 750mm wide x 1070mm deep, and the deep form factor, 600mm wide x 1200mm deep. The Dell racks are complemented with a range of products that include basic, metered, and managed power distribution units (PDUs), rack-mount uninterruptible power supplies (UPSs), digital keyboard/video/monitors (KVMs), and other accessories.

All of these form factors adhere to the EIA-310-E standard for rack mounting of electronics, ensuring that the mounting posts for installing components are configured for 19-inch equipment, while the exterior of the rack is set to the specified dimensions. This ensures compatibility with existing equipment while providing more options for cable and power cord routing. Not only do Dell PowerEdge servers fit in these 19-inch racks, but other Enterprise equipment fit as well, including Dell PowerVault™ and Dell EqualLogic™ storage, and Dell PowerConnect™ networking switches, plus routers, hubs, and telephony equipment. Built with adjustable vertical mounting posts within the rack, Dell racks are designed for use in almost any environment, such as an Enterprise data center, a high-performance computing center, a remote office, a wiring closet, or a factory floor.

Benefits

Table 1 lists the benefits of the rack enclosures.

Table 1.   Benefits

Benefits	Detailed descriptions
Height options	Dell PowerEdge rack enclosures offer three height options: 24U, 42U, and 48U
Form factors	42U and 48U are available in standard, wide, and deep form factors
Door design	Excellent airflow with 80% perforated doors
Cabling and PDUs	Superb design facilitates more cabling and power distribution options

With a static load rating of 2,500 lbs and three form factors to choose from, the PowerEdge 42U and 48U rack enclosures can provide the capacity you need to hold a full complement of data center equipment. These sizes are available in three form factors:

- **Standard:** 600mm wide x 1070mm deep
- **Wide:** 750mm wide x 1070mm deep
- **Deep:** 600mm wide x 1200mm deep

Wide (750mm) racks in both 42U and 48U heights have three inches more space on each side for cables and PDUs for networking, blade server and other installations that need to route cables along the sides. The wide design of the 4820W and 4220W also moves the PDU trays even farther away from the rack mounting posts, allowing more room for cables in the sides and back, helping reduce contention between power cords, cables and installed equipment.

Deep (1200mm) racks offer more space in the back for cables and PDUs for high-density installations. The 4820D and 4220D racks have extended PDU trays in the back of the rack, which can hold up to four vertical-mount full-height PDUs on each side. This extra space can be used for additional power management or for routing cables. PDUs can also be mounted with a 90-degree rotation so that the power cords point toward the back of the rack rather than toward the middle.

2 Rack enclosure features

Table 2 contains the basic specifications for the rack dimensions and weights, while Table 3 provides more details on features and specifications for the rack enclosures.

Enclosure specifications

Table 2. Basic rack specifications

Dimensions	PowerEdge 4820 48U rack enclosure	PowerEdge 4220 42U rack enclosure	PowerEdge 2420 24U rack enclosure
Standard rack enclosure	Height 89.5" (2273mm) Width 23.8" (605mm) Depth 42.1" (1070mm) Weight 315 lbs (143 kg)	Height 78.7" (1999mm) Width 23.8" (605mm) Depth 42.1" (1070mm) Weight 298 lbs (135 kg)	Height 47.3" (1202mm) Width 23.8" (605mm) Depth 42.1" (1070mm) Weight 209 lbs (95 kg)
Deep rack enclosure	Height 89.5" (2273mm) Width 23.8" (605mm) Depth 47.2" (1200mm) Weight 342 lbs (155 kg)	Height 78.7" (1999mm) Width 23.8" (605mm) Depth 47.2" (1200mm) Weight 318 lbs (144 kg)	
Wide rack enclosure	Height 89.5" (2273mm) Width 29.8" (755mm) Depth 42.1" (1070mm) Weight 351 lbs (159 kg)	Height 78.7" (1999mm) Width 29.8" (755mm) Depth 42.1" (1070mm) Weight 335 lbs (152 kg)	

Table 3. Rack features and specifications

Features	Rack technical specifications
Rack form factor	- Static load rating of 2,500 lbs for 48U/42U and 1,500 lbs for 24U - Large open base for cable entry and exit - Rack-top cable exits with adjustable, sliding door and removable tail bar - Reversible front door can be configured to open from left or right, with lock - Dual rear doors with lock (same key as front door) - Split side panels, with locks (same key as doors) - Removable front and rear doors have an 80% open perforation pattern to aid in thermal management - Reinforced frame for stability - Adjustable square-hole EIA mounting posts can be positioned forward or backward within the rack - U-space numerical markings on both front and rear mounting posts - Rear-mount vertical PDU trays - Rotating rear casters to easily position rack - Easily accessible leveling feet
Rack color	Black with aluminum accents
Products supported	All Dell and third-party rack-mount equipment compliant to the EIA-310-E standard

Features	Rack technical specifications
Shipping options	Standard ground shipping pallet Air freight container

Comparison of PowerEdge rack enclosures

Table 4 compares the basic specifications of the rack enclosure portfolio.

Table 4.   Comparison of PowerEdge rack enclosures

Features	Dell 2420	Dell 4220/4820	Dell 4220W/4820W	Dell 4220D/4820D
U Spaces	24U	42U/48U	42U/48U	42U/48U
Height (mm)	1202	1999/2273	1999/2273	1999/2273
Width (mm)	605	605	755	605
Depth (mm)	1070	1070	1070	1200
Static load capacity	1500 pounds	2500 pounds	2500 pounds	2500 pounds
Vertical PDU capacity	Up to 4 HH[1]	Up to 4 FH[2] Up to 8 HH	Up to 4 FH Up to 8 HH	Up to 8 FH Up to 16 HH
0U access	Limited	Limited	Improved	Limited

[1] Half-height
[2] Full-height

3 Rack enclosure views and features

The Dell PowerEdge rack enclosures provide important power distribution, cooling and cabling options for a range of Enterprise environments, including high density installations such as HPC and newer/reconfigured data centers where the facilities are equipped to support higher thermal and power loads per rack.

All Dell racks offer enhanced power management, efficient cooling, and simplified component mounting and storage for a wide range of IT equipment. The PowerEdge 4820 rack enclosure is designed for high-density data centers where floor space is at a premium. The PowerEdge 4220 rack enclosure is designed to provide Enterprise efficiency for all sizes of data centers, while the PowerEdge 2420 rack enclosure provides a compact option.

PowerEdge 2420 rack enclosures

The PowerEdge 2420 rack enclosure is very similar to its larger family members, but does have some specific differences.

- Most noticeably, the rack is 24U high, providing a compact enclosure for smaller data rooms.
- The static load capacity of the 24U rack is 1,500 pounds.
- The top canopy is not perforated, thereby providing a solid surface on the top of the rack.
- The lower height accommodates up to four of the half-height vertical PDU offerings.

Figure 1 and Figure 2 show the various external views specific to the 2420 rack enclosure.

Front   Rear   Frame

Figure 1.   Front, rear, and frame views of the 2420 rack enclosure

Figure 2.   Top view of the 2420 rack enclosure

PowerEdge 4220 and 4820 rack enclosures

The PowerEdge 4220 and 4820 rack enclosures have identical features except the 4820 rack enclosure adds 6U of height.

- 42U and 48U heights are available in standard (600mm x 1070mm), wide (750mm x 1070mm) and deep (600mm x 1200mm) form factors.
- Static load capacity of the 42U and 48U racks is 2,500 pounds.
- Top canopy is perforated, providing a path for airflow through the top of the rack.

The following sections and figures show the various external views specific to the 4220 and 4820 rack enclosure options.

| 4220, 4220D | 4220W | 4820, 4820D | 4820W |

Figure 3.   Front view and features

The wide and deep racks have the same design style as the standard 4220 and 4820 racks. In fact, the deep racks look the same as the standard racks in a straight-on front or back exterior view, but the extended depth can be seen in a side view. The additional 3 inches added on each side of the wide rack are noticeable in the front and rear view of the rack, but from the side, the wide racks look the same as the standard racks.

Dell rack enclosures have faster and easier access to the rear of rack with a single latch for both doors. All of the 42U and 48U racks have two-piece side panels for easier removal and access to the sides of the IT equipment and cables, as well as a split rear door design that includes a single latch mechanism.

| 4220 | 4220D | 4220W |

Figure 4.   Back view of the 4220 rack enclosures

4820D   **4820W**

Figure 5. Back view of the 4820 rack enclosures

4220D   **4220, 4220W**

Figure 6. Side view of the 4220 rack enclosures

4820D   **4820, 4820W**

Figure 7.   Side view of the 4820 rack enclosures

Top canopy knock-outs and adjustable rear-of-rack sliding cable exit door enable cabling from above. The rack's large open base and removable side panels offer more options for cable access. The basic design of the canopy is similar between the three form factors, as shown in Figure 8.

Standard

Deep

Wide

Figure 8.   Top view of the rack enclosures

Removable "tail-bars" at both top and bottom of the rear of the rack, shown in Figure 9, make cabling the IT equipment easier, especially in highly dense environments with three-phase power cables deployed. The bars can be re-attached after the cables are in place.

Figure 9.   Tail bar access for cables

Rack interior features

Each of the PowerEdge rack enclosure form factors accommodates servers with deep chassis dimensions while allowing space for power and cable management.

PDU trays

In addition to U-space PDU mounting, the PowerEdge rack enclosures have specially designed trays inside the rear doors to easily mount vertical PDUs, without using any tools, so they won't interfere with air circulation. These trays are positioned as far back and out from the rear of the equipment as possible, to reduce contention with cable management arms and equipment with removable components. The PDU tray design provides more options for mounting various PDU types, and provides access to the square holes in the rear frame posts for additional cable management options. Dell vertical mount PDUs are available in a number of sizes and can be combined within a rack. For more information, see the Rack kit accessories section.

Deep racks have expanded PDU trays in the back of the rack, which can be used for additional power management or for routing cables. **Wide racks** have extra distance between the mounting posts and the sides of the racks, moving the PDU trays even farther away from the rack's mounting posts and the equipment installed in the rack, which reduces interference between installed equipment and cables. The trays in the standard and wide racks can hold up to four full-height or eight half-height units while the deep rack trays can accommodate twice as many.

Note the clearly labeled U markings on the mounting posts for easier installation and service; markings are provided on both the front and rear mounting posts.

Cable management clips are available for routing cables along the rear mounting posts.

| Standard | Deep | Wide |

Figure 10.   Vertical-mount power distribution unit trays

Rack stability and security

Each rack includes rotating rear casters for better maneuverability when positioning the rack in the data center. The leveling feet are easily accessible to facilitate firm placement.

| Standard / Deep | Wide |

Figure 11.   Casters and leveling feet

Stabilizer feet, included with the rack, attach to the front and sides of each rack enclosure for increased stability. Stabilizer feet have an "open face" to allow cold air to pass through and also have holes to attach the stabilizer feet to the floor. Stabilizer feet should be attached to the front and both sides of a stand-alone rack. Interconnect kits are available to link adjacent rack enclosures for increased stability.

Figure 12.   Stabilizer feet

Lockable side panels and front and rear doors provide security for data centers, remote offices, wiring closets, factory floors and other server environments. Front and rear door locks and side panel locks are keyed alike for easier opening; different lock sets can be provided through Dell S&P if needed.

Figure 13.   Front, side, and rear latches and locks

4 Thermal and airflow considerations

Dell rack enclosures are designed for maximum airflow and the reduction of thermal issues, which means greater efficiency and power savings for your data center.

Thermal and airflow features

The front and rear doors have 80% perforation to allow air to move through the rack with minimal resistance, and flexible air dams help keep hot air from recirculating from the back to the front, alleviating a problem common in many racks. Dell's wide rack enclosure employs extended air dams across the front to ensure proper airflow containment. Available blanking panels can further manage airflow by filling unused U-space in the rack; see the **Rack kit accessories** section for information on thermal accessories.

For hot-aisle/cold-aisle thermally-efficient data center topologies, the standard rack enclosure fits within two standard floor tiles, in a space approximately 2 feet wide x 3.5 feet deep. The 750mm wide rack is slightly wider and the 1200mm deep rack is slightly deeper. Space planners can select the form factor that best meets data center needs.
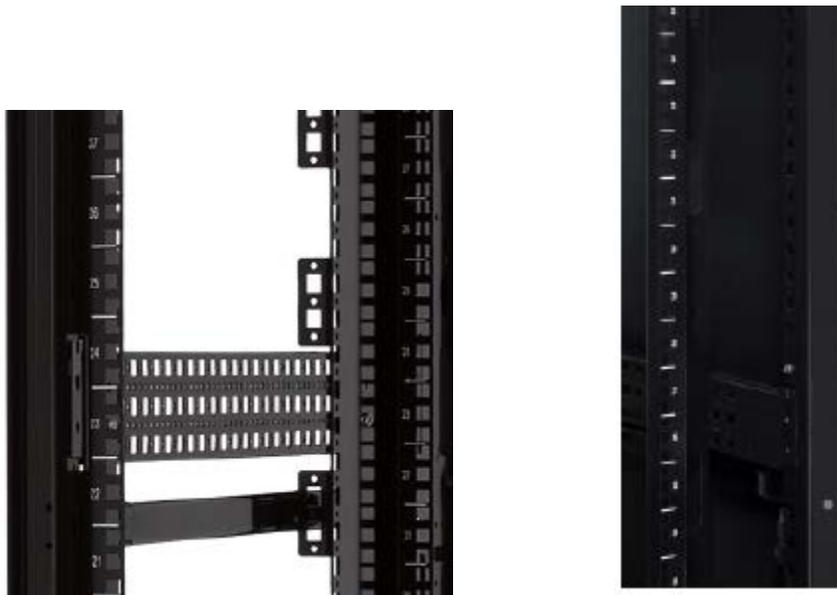
5 Installing rack enclosures

Dell rack enclosures are compliant to EIA/ECA-310-E and IEC 60297-3-100 design specifications. Dell racks use the square-hole design and are compatible with Dell and third-party rack-mount systems.

Adjustable mounting posts

Dell racks have four adjustable vertical mounting posts to enable flexibility of the location of IT equipment within the rack; this allows devices to be positioned closer to the front door or to the rear door. These posts are positioned at 29 inches apart, but can be adjusted from 24 to 30 inches. The front air dam seal can be maintained within 2 inches of adjustment.

Figure 14.   Adjustable vertical mounting posts

For information regarding proper installation and cabling techniques for the Dell racks and servers, please refer to *the Rack Installation and Cable Management Arm Installation Instructions and Cabling Best Practices* for the appropriate server model. Additionally, rack installation guides and related documentation may be found at: http://support.dell.com/support/edocs/systems/racks/.

Dell ReadyRails and ReadyRails II

The rails and cable management solutions for Dell 11th and 12th generation server platforms have been designed to enable the user-friendly *slam* latches (spring-loaded latches that engage automatically) on the chassis, to expand third-party rack compatibility and to improve the overall customer experience. The efficient design makes the release latch visible and accessible from the front of the rack, with no special tools or empty U-spaces above or below required to disengage, making the rails equally easy to remove.

Dell 11th generation server rails include the simple and intuitive ReadyRails™ rack/rail interface for tool-less mounting in EIA-310-E compliant square hole and unthreaded round-hole 4-post racks. Dell's server, storage, and networking systems can be easily installed into the Dell PowerEdge 4820, 4220, and 2420 rack enclosures using the Dell ReadyRails static and sliding rail kits. Static rail kits can be mounted, with a minor conversion using tools, into 4-post threaded hole racks and 2-post

racks. Sliding rails require an adapter bracket for installation in threaded-hole racks. Other products including rack-mount UPS systems, KVMs, and the 1U equipment shelf also use the ReadyRails interface.

With the 12th generation servers, the rack/rail interface for the sliding rails has been updated to the ReadyRails™ II design, which provides native support (with simple conversion) for threaded-hole racks. ReadyRails and ReadyRails II rail kits are extremely fast and easy to deploy and are as easy to remove from the rack as they are to install.

The rail kits are available in either sliding or static style, based on the system specifications and the customer's needs. **Sliding rails** allow the system to be fully extended out of the rack for service and have an optional cable management arm (CMA) that provides a guide for component cable routing to the rear of the rack. **Static rails** support a wider variety of racks than the sliding rails but do not support serviceability in the rack. Due to their reduced complexity and lack of need for CMA support, the static rails offer a smaller footprint than the sliding rails.

Sliding   Static

Figure 15.   ReadyRails II and ReadyRails mounting kits

Cable management arm (CMA)

The optional cable management arm (CMA) for the sliding rails organizes and secures the cords and cables exiting the back of the server and unfolds to allow the server to extend out of the rack for service without having to detach the cables. Key features of the CMA shown in Figure 16 include:

- Large U-shaped baskets to support dense cable loads
- Open vent pattern for optimal airflow
- Fully reversible (can be mounted on either side) with no conversion required
- Uses hook-and-loop straps rather than plastic tie wraps to eliminate the risk of cable damage during cycling
- Includes a low profile fixed tray to both support and retain the CMA in its fully closed position
- Both the CMA and the tray mount without the use of tools with intuitive snap-in designs

Figure 16.   Cable management arm

6 Rack kit accessories

Dell offers thermal, power, and management rack solutions as well as optional rack accessories designed for maximum compatibility with a wide array of rack enclosure configurations.

Thermal solutions

In order to help with proper air flow in the rack and improve cooling efficiency, Dell offers optional rack fan kits and blanking panels.

Blanking panels

Dell offers closeout filler panels in a variety of sizes and materials to fit in the Dell PowerEdge racks. Closeout filler panels, also called blanking panels, provide a way to fill unused rack space in the front of a rack, resulting in improved air flow to the installed equipment, and reducing hot air recirculation to the front of the rack. Using closeout filler panels helps to implement data center best practices, which lead to a common goal: creating the coldest possible intake temperature with the highest possible volume of chilled-air delivery and the warmest possible exhaust temperature.

Plastic closeout filler panels are tool-less, and provide easy and quick snap-in installation for square-hole racks. These are available in 1U and 2U sizes.

Steel closeout filler panels provide support for more types of racks, with tooled installation for square, round, or threaded holes. Multiple sizes are available for optimizing coverage in 1U, 2U, 3U, or 6U increments, as listed in Table 5. Hardware with #10-32 threads is provided to support installation in threaded hole racks.

Table 5.   Blanking panel options

Panel options	Plastic	Steel
Single-pack	1U, 2U	1U, 2U, 3U, 6U
10-pack	1U, 2U	1U, 2U
100-pack	1U	–
Square-hole	☑	☑
Round-hole	–	☑
Threaded-hole	–	☑

Fans

Dell offers three rack fans that can be installed in the top of the 42U and 48U racks to facilitate the movement of air through the upper canopy. The options are 120V, 208V, and 230V to handle different voltage requirements. The package includes the rack fan, power cable, grounding cable and cover.

Power solutions

Dell provides the ideal PDU and UPS systems to protect and support Enterprise applications. With three-year warranties and Dell's world class support and reliability, the extensive portfolio of Dell PDUs and UPSs can be mixed and matched to create the right combination for your data center needs.

Power distribution unit

A PDU (power distribution unit) distributes power from a single input to multiple outlet receptacles. Reliable power distribution is a key component of every data center. The Dell PDU portfolio provides reliable power distribution in a rack enclosure from low amperage single phase circuits to higher-power 3-phase solutions. The Dell power distribution portfolio includes basic, metered, and managed functions, input voltages from 100 volts to 415 volts, input currents from 16 amps to 60 amps, and varying quantities of outlet types, up to 48 receptacles. In addition to the amperage rating, Dell specifies the true measure of power consumption for the PDU in kilowatt-hours (kWH).

The Dell family of PDUs combines worldwide standard IEC power outlet connections with regionalized input options allowing flexibility across a variety of global power infrastructures. Detachable inlet cords on some models facilitate a wide selection of deployment options.

Dell PDUs come in several form factors. One and zero rack unit (1U/0U) PDU models can be placed in a 1U rack space with other rack-mount equipment or in the side of some racks. Dell also offers vertical PDUs in half-height length for all Dell racks, full-height for 42U/48U racks, and extended-height for 48U racks, providing the flexibility to select the right PDU for the equipment in the rack. The vertical PDUs can be installed without tools utilizing button mounting in the rear trays of the Dell racks, with the outlets facing toward the center of the rack, or turned 90 degrees to direct the outlets toward the back of the rack to help with cord management.

The 42U and 48U high-density vertical PDUs include a greater number of highly packed outlet receptacles, in both basic and metered versions. These are ideal for larger deployments that will maximize the amount of equipment installed in a rack. For example, one high-density PDU could handle all of the power supplies in multiple blade server systems installed in one rack.

Dell Metered and Managed PDUs simplify the deployment of advanced power metering and environmental monitoring in the data center. Real-time remote monitoring of connected loads prevents potential overloads. User-defined alarms can warn of potential circuit overloads before critical IT failures occur. Data logging can provide load metering and report power utilization trends, enabling data center managers to make informed decisions on right-sizing IT environments to lower the total cost of ownership. Users can access and configure the Dell Metered or Managed PDU with embedded firmware through secure Web, SNMP, or Telnet interfaces, and also leverage the Dell Management Console (DMC), which provides IT administrators a consolidated view of their infrastructure.

Optional cord retention kits help to manage the power cords plugged into the PDU. Other accessories for the Dell Metered and Managed PDUs include temperature, temperature/humidity, and dry contact sensors. The dry contact port can be used for user-defined sensors, such as rack door position, motion, light detector, and proximity sensors.

Dell PDUs are specified for a higher operating temperature of 50° Celsius (122° Fahrenheit), which is especially important for the warmer environment in the back of the rack. The PDUs also come with a full three-year warranty.

Uninterruptible power supply

Also available with a three-year warranty, including batteries, Dell UPS (uninterruptible power supply) backup systems are available in line-interactive and online models in tower and rack-mount styles. The Dell UPS protects equipment from downtime, damage and data loss due to power problems. During a power outage, the Dell UPS backup power supplies allow you to maintain power long enough to save data and shut down equipment properly. As an added benefit, the systems also protect against power surges and disruptive line noise.

Each Dell UPS is rated for maximum output power expressed in Watts (W), which describes the total load that can be managed across all receptacles. All models are built to run at up to a 97% efficiency rating.

Dell's line-interactive (LI) tower and rack-mount UPSs provides reliable, vital power backup of IT equipment ranging from 500W to 5600W. LI models regulate voltage by boosting input utility voltage up or moderating (bucking) it down as necessary before allowing it to pass to the protected equipment—or resort to battery power.

Dell's online (OL) high-efficiency rack-mount UPSs offer the best combination of power protection and reliability for backup of critical IT equipment covering 2700W to 5600W by isolating equipment from raw utility power. These models combine power back-up and power conditioning for continuous cleaner power and protection against all power disturbances.

The internal batteries in Dell UPSs can run protected equipment for five to ten minutes (depending on the model) at full load during a power outage, or up to triple that time if the UPS is at half load. In that time, system administrators can gracefully shut down connected systems or transfer to generator power. In high reliability environments where it is important to keep systems running rather than shut them down, an optional external battery module (EBM) can extend battery runtime three or four times for all but the smaller (500W) Tower UPS and (1000W) Rack UPS models.

Dell UPS systems come with installed management software, an advanced graphical LCD, and tool-less rack mounting using the Dell ReadyRails interface. The large backlit display, available in nine languages, allows you to easily view system status and configure UPS parameters and options, providing a comprehensive view of the UPS status and easy navigation among functions. Remote monitoring and DMC integration are enabled with the optional network management card, which supports secure access from anywhere over the company LAN or the Internet, with no additional software required. With this configuration, you can manage multiple UPSs, control multiple servers connected to a UPS, and conduct orderly, unattended power shutdown of connected equipment.

Management solutions

Dell rack solutions include Dell keyboard, video, mouse (KVM) console switches and Dell keyboard, monitor, mouse (KMM) consoles.

Keyboard, video, mouse switches

The Dell KVM console switches enable users to need only one keyboard, mouse, and monitor to simultaneously access multiple servers. Similar to the Dell servers and UPS, the KVM can be easily mounted into a 1U space in the front or back of a Dell rack using a tool-less ReadyRails kit. Dell offers both analog and remote switches, all of which are Trade Agreement Act (TAA)-compliant.

The Dell KVM 1081AD and 2161AD server console switches (SCS) provide KVM functions at the rack for 8 or 16 devices through one or two local ports. These analog switches offer an optional remote access key as an upgrade. The SCS easily enables control of multiple servers from a single console.

SCS's Virtual Media support allows servers to access storage media attached to the KVM, enabling out-of-band file transfers and OS patch deployments. You can also:

- Connect devices with four USB 2.0 ports, and up to 16 Analog Rack Interface (ARI) ports to access servers.
- Manage your Enterprise with two local paths (video head and Analog Console Interface (ACI))
- Quickly mount the SCS in the rack without tools thanks to the Dell ReadyRails mounting interface
- Enforce multi-factor authentication over USB and Ethernet with the Common Access Card capability for smart cards.

The Dell KVM 1082DS, 2162DS and 4322DS remote console switches (RCS), also called KVM over IP switches, perform management in a heterogeneous environment for Dell and third-party servers, serial devices, and PDUs. In addition, they help simplify server management with integrated firmware and provide access locally in the data center and also remotely, with enhanced features including CAC (Common Access Card) capability, true serial support, and multiple USB ports.

Users can manage Dell KVM switches and perform all KVM functions on LAN or WAN with the easy-to-use client software and remote/local on-board web interface (OBWI), and easily update and install firmware, applications, and operating systems either locally or remotely by using virtual media (VM) or local USB.

Features and enhancements to the Dell KVM over IP switches include:

- **Security**: You can use CAC over USB as a general identification card and an identification device for authorized personnel and for authentication. You can also set passwords for local and remote access, as well as the management port. You can encrypt keyboard, mouse, video, and VM using one of these methods: Advanced Encryption Standard (AES), 128-bit Secure Sockets Layer (SSL), Data Encryption Standard (DES), and 3DES. Using local security, you can set access rights and permissions for users and administrators.
- **Availability**: With dual Gigabit Ethernet ports and dual power supplies, Dell KVMs offer failover redundancy for high availability environments that need to ensure that data centers aren't adversely affected by partial network or power outages. An external modem port provides another means of accessing the switch if the network is compromised.
- **Performance**: Remote console switches provide superior remote video performance because of the improved video compression and flexibility in configuration, even over larger distances between console switches and server interface pods (SIPs).
- **Options**: The new USB 2.0 SIP provides support for full-speed VM and CAC data transfer. The new serial SIP connects serial devices to the KVM without emulation, using the same console. KVM functions work with all existing Dell CAT5-based PS/2, USB 1.1/2.0, and serial SIPs.

Dell KVM over IP console switches offer a greater level of monitoring and preventive maintenance, providing the benefits of remote server and heterogeneous datacenter management.

Keyboard, monitor, mouse console

The Dell KMM console can be connected to the KVM console switch, to provide at-the-rack visibility to the devices connected to the KVM. This console, with a flat panel screen and an integrated touchpad-keyboard, can be installed without tools into a 1U space in a Dell rack.

Additional accessories

Equipment shelf

For components that do not come with rails for rack-mounting installation, Dell offers the 1U fixed equipment shelf that installs tool-lessly into square-hole or unthreaded round-hole racks using the ReadyRails mounting interface. The rail design for the shelf also supports tooled installation in four-post and two-post threaded-hole racks for added versatility. This steel shelf can hold up to 200 pounds of weight, and comes with a pair of hook-and-loop straps to secure cables to the shelf.

Side panels

All form factors of the 42U racks share the same two-piece side panel kit, and all form factors of the 48U racks also share a two-piece side panel kit. The deep racks also have a third side panel placed vertically over the rear extension.

Interconnect kit

Dell provides an interconnect kit, also called a baying kit or ganging kit, that connects any two *xx*20 racks of the same height together. 4220 racks may also be connected to a 4210 rack using the kit. Side panels must be removed to install the interconnect kit.

Accessory compatibility table

Table 6 provides a reference table to show which Dell rack accessories are compatible with the various rack enclosures. The power and management accessories noted in the previous sections are compatible with all of the offerings in this generation of racks.

Table 6.   Rack accessories for Dell rack enclosures

Description	2420	4220	4220D	4220W	4820	4820D	4820W	Comments
Rack Side Panel Kit for 42U racks		☑	☑	☑				4220D also requires 42U deep rack rear side cover
Deep Rack Rear Side Cover for 42U deep rack			☑					Use with 42U rack side panel kit
Rack Side Panel Kit for 48U rack					☑	☑	☑	4820D requires 48U deep rack rear side cover
Deep Rack Rear Side Cover for 48U						☑		Use with 48U rack side panel kit
Rack Door Kit for 42U standard & deep racks		☑	☑					Front and Rear Doors for 600MM Rack Not for Wide Rack
Rack Interconnect Kit	☑	☑	☑	☑	☑	☑	☑	Use to attach Racks of the same height to each other
1U Static Equipment Shelf	☑	☑	☑	☑	☑	☑	☑	200-lb capacity fixed shelf with Square, Round or Threaded Hole Support for 4-Post and 2-Post Racks
1U Rack Blanking Panel	☑	☑	☑	☑	☑	☑	☑	Plastic Tool-less (Snap-in)
2U Rack Blanking Panel	☑	☑	☑	☑	☑	☑	☑	Plastic Tool-less (Snap-in)
1U Rack Blanking Panel	☑	☑	☑	☑	☑	☑	☑	Steel Pack
2U Rack Blanking Panel	☑	☑	☑	☑	☑	☑	☑	Steel Pack
3U Rack Blanking Panel	☑	☑	☑	☑	☑	☑	☑	Steel Pack
6U Rack Blanking Panel	☑	☑	☑	☑	☑	☑	☑	Steel Pack
42U/48U Rack Mount Fan - 120V		☑	☑	☑	☑	☑	☑	NOTE: Not for 24U Racks
42U/48U Rack Mount Fan - 208V		☑	☑	☑	☑	☑	☑	NOTE: Not for 24U Racks
42U/48U Rack Mount Fan - 230V		☑	☑	☑	☑	☑	☑	NOTE: Not for 24U Racks
Side Stabilizer Kit	☑	☑	☑	☑	☑	☑	☑	Now Included with all racks

7 Rack packaging options

Dell rack enclosures are available for ground or air shipment. Dimensions and weights for each option are shown in Table 7.

All Dell racks can be shipped in full configuration with frame, doors, and sides, or in reduced configuration with frame and doors. The 2420 and 4220 standard racks are also available as frame only.

Table 7.   Packaging options for Dell rack enclosures

Item	Product weight	Weight/dimensions ground shipment	Weight/dimensions air shipment
4820 Frame, Doors, Sides	143 Kg	173 Kg 2430 x 770 x 1185 (MM)	254 Kg 2372 x 791 x 1226 (MM)
4820 Frame, Doors	110 Kg	140 Kg 2430 x 770 x 1185 (MM)	221 Kg 2372 x 791 x 1226 (MM)
4820D Frame, Doors, Sides	155 Kg	188 Kg 2430 x 770 x 1315 (MM)	317 Kg 2372 x 791 x 1356 (MM)
4820D Frame, Doors	122 Kg	155 Kg 2430 x 770 x 1315 (MM)	284 Kg 2372 x 791 x 1356 (MM)
4820W Frame, Doors, Sides	159 Kg	190 Kg 2430 x 920 x 1185 (MM)	326 Kg 2372 x 941 x 1226 (MM)
4820W Frame, Doors	126 Kg	157 Kg 2430 x 920 x 1185 (MM)	293 Kg 2372 x 941 x 1226 (MM)
4220 Frame, Doors, Sides	135 Kg	164 Kg 2160 x 770 x 1185 (MM)	225 Kg 2102 x 791 x 1226 (MM)
4220 Frame, Doors	106 Kg	135 Kg 2160 x 770 x 1185 (MM)	196 Kg 2102 x 791 x 1226 (MM)
4220 Frame Only	86 Kg	114 Kg 2160 x 770 x 1185 (MM)	176 Kg 2102 x 791 x 1226 (MM)
4220D Frame, Doors, Sides	144 Kg	176 Kg 2160 x 770 x 1315 (MM)	296 Kg 2102 x 791 x 1356 (MM)
4220D Frame, Doors	116 Kg	148 Kg 2160 x 770 x 1315 (MM)	268 Kg 2102 x 791 x 1356 (MM)
4220W Frame, Doors, Sides	152 Kg	200 Kg 2160 x 920 x 1185 (MM)	309 Kg 2102 x 941 x 1226 (MM)
4220W Frame, Doors	124 Kg	167 Kg 2160 x 920 x 1185 (MM)	281 Kg 2102 x 941 x 1226 (MM)
2420 Frame, Doors, Sides	95 Kg	120 Kg 1362 x 770 x 1185 (MM)	163 Kg 1304 x 791 x 1226 (MM)

8 Mechanical drawings

This section contains the basic external and internal drawings for each of the rack form factors.
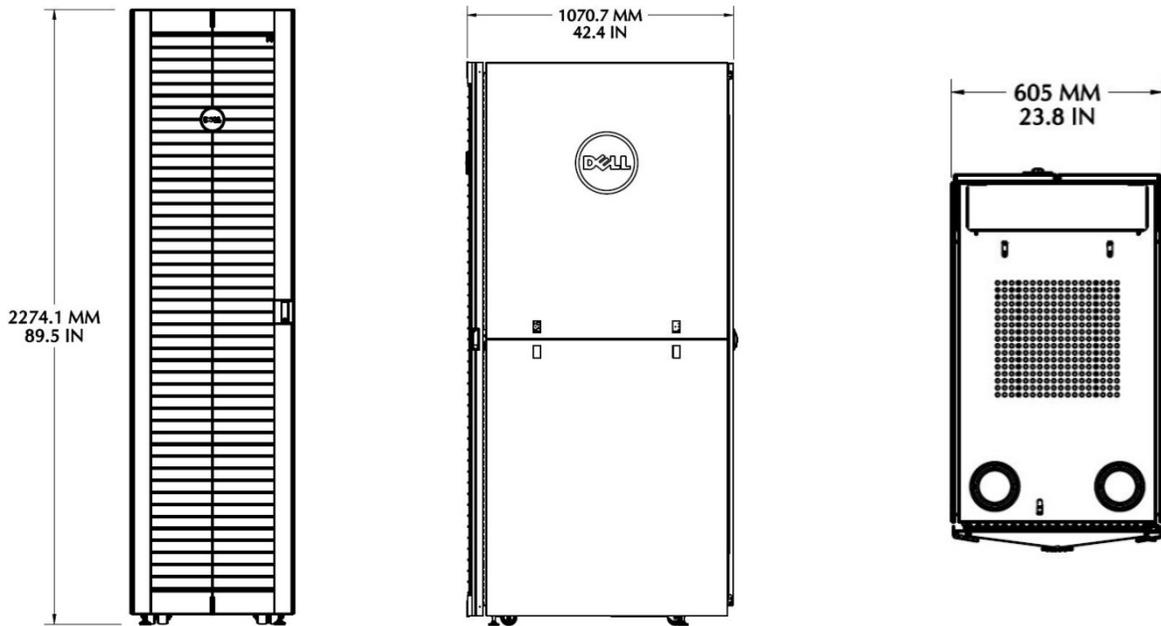

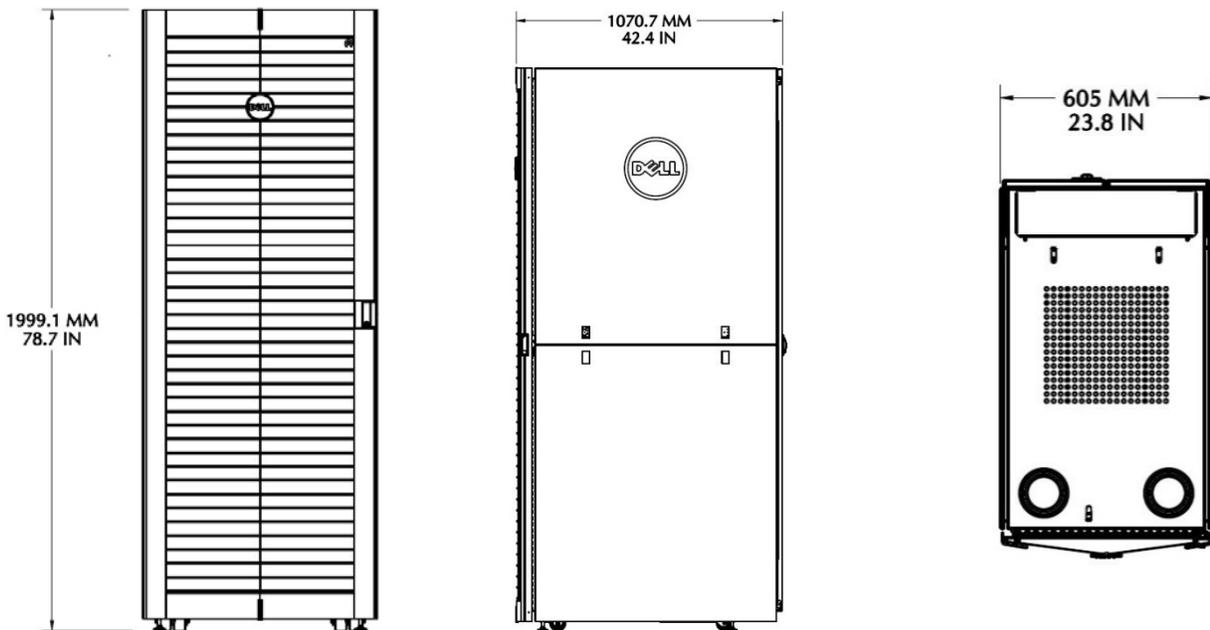**Figure 17.   External dimensions − 4820 rack enclosure**

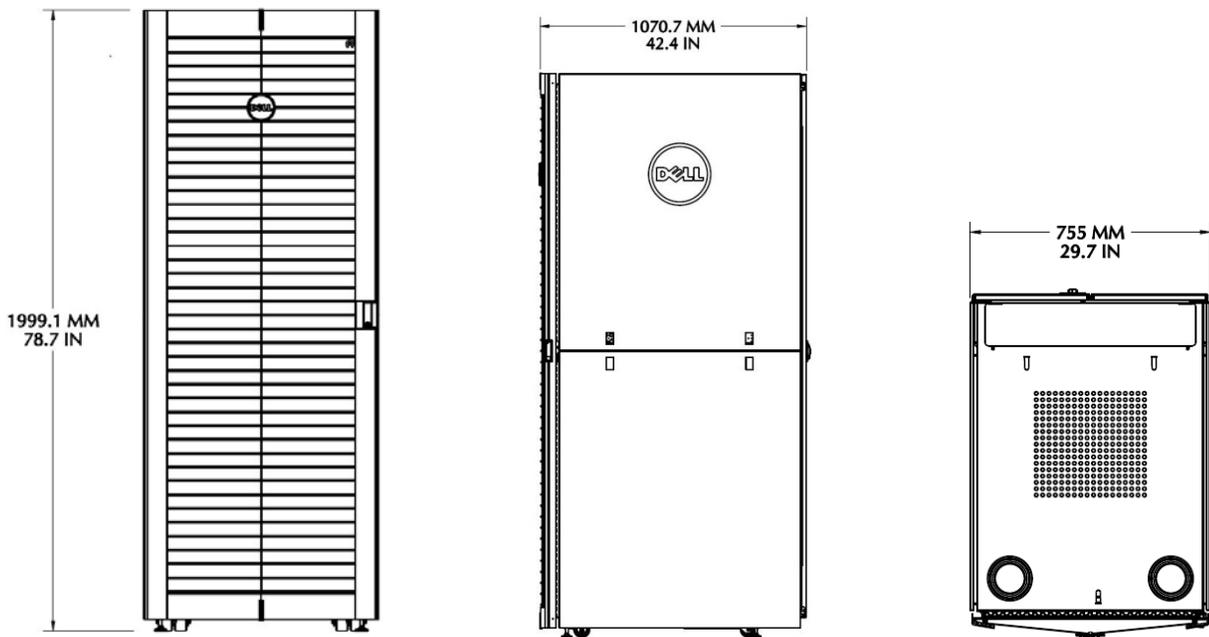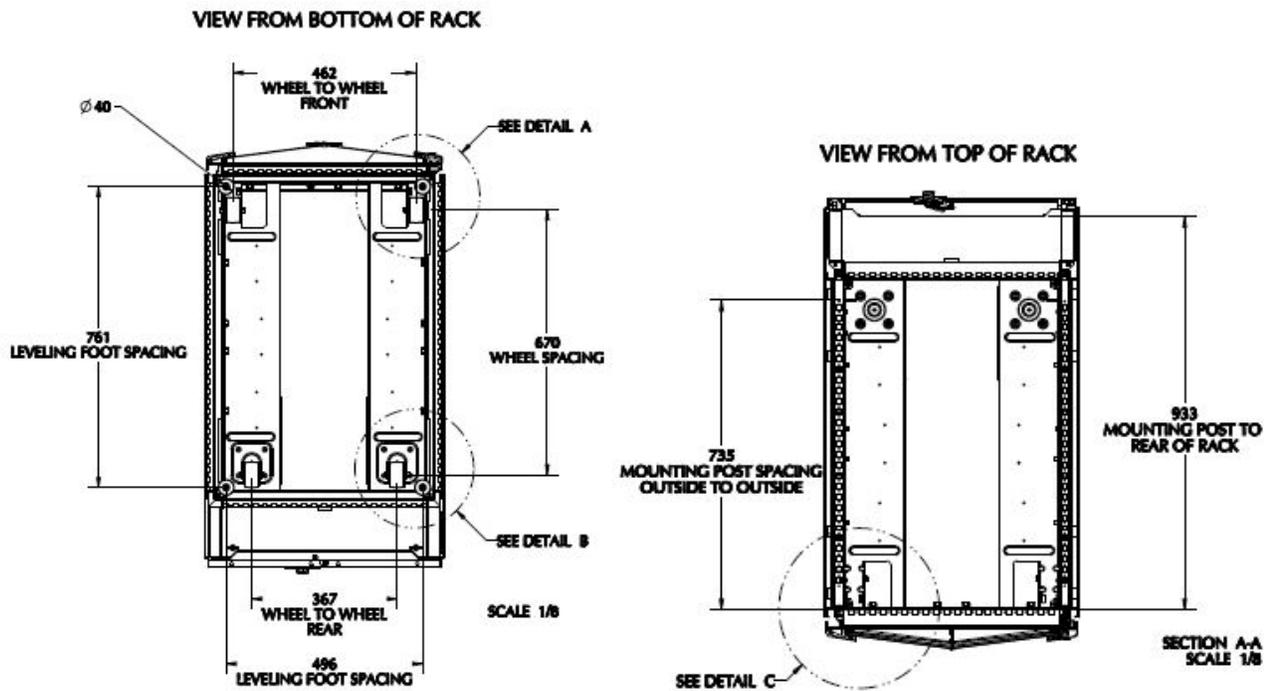**Figure 18.   External dimensions − 4220 rack enclosure**

Figure 19.   External dimensions – 2420 rack enclosure

Note: For Detail A, Detail B, and Detail C views, see Figure 21.

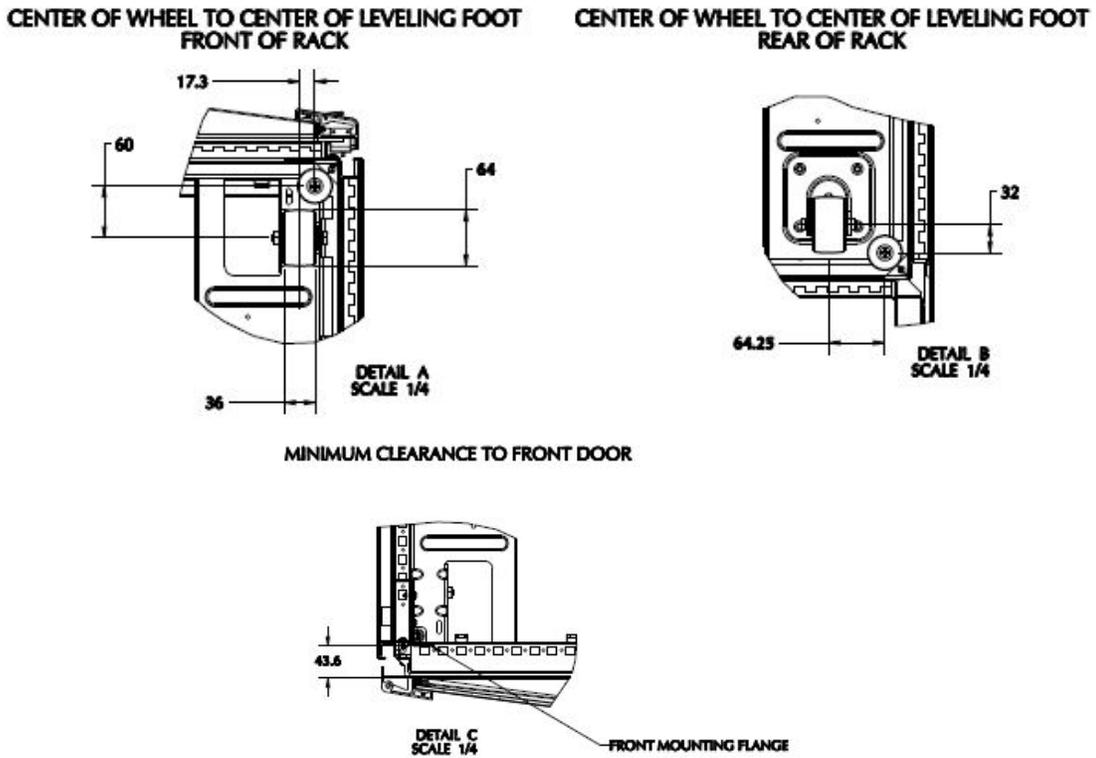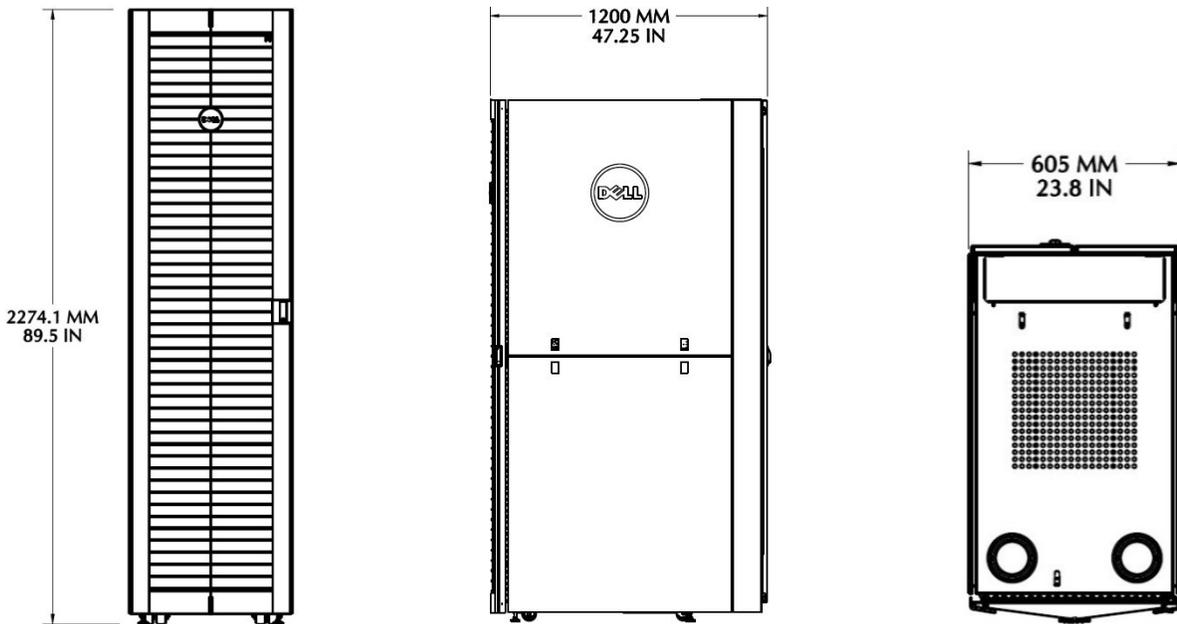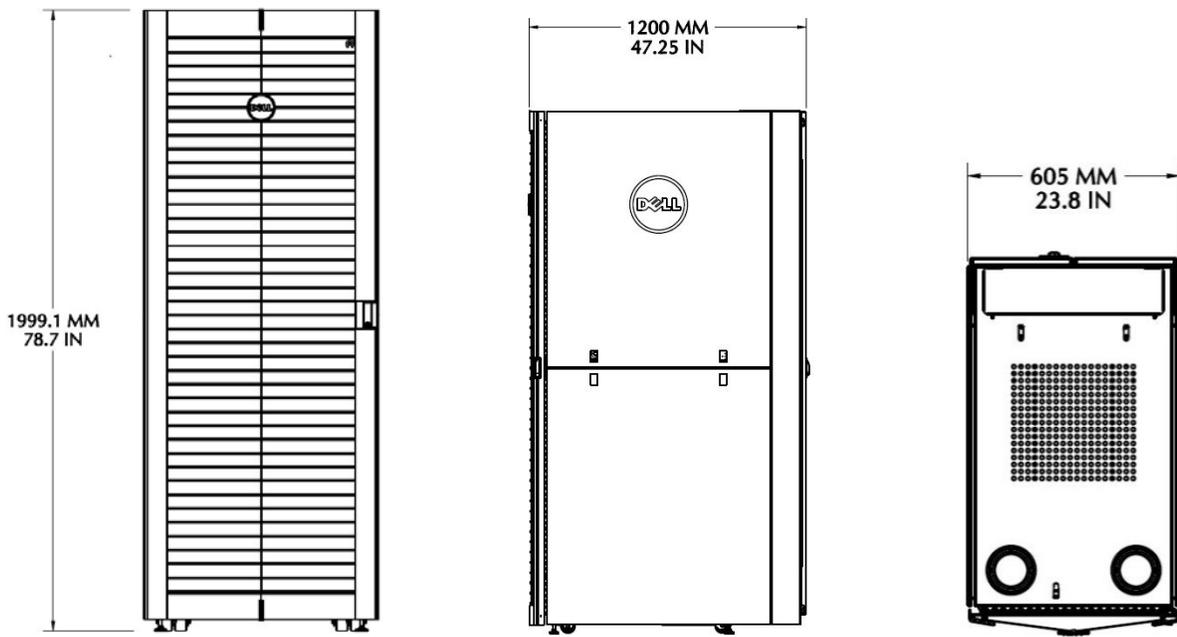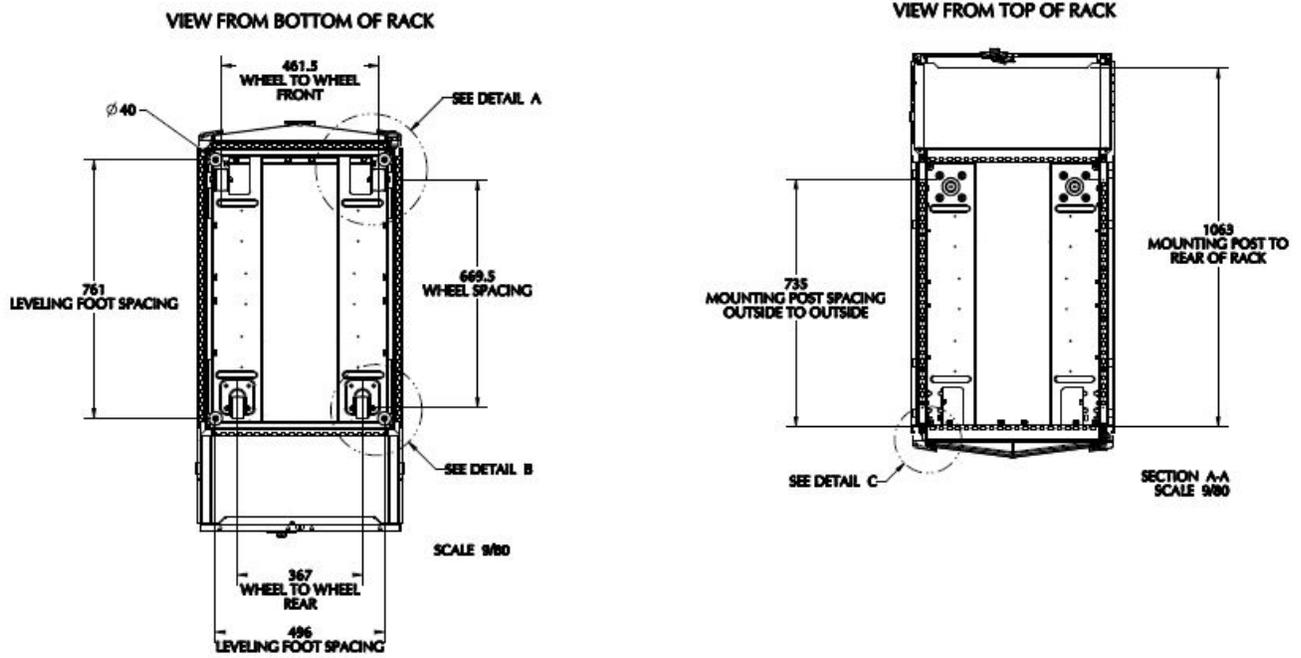**Figure 20.   Internal dimensions – 2420, 4220, 4820 (top and bottom views)**

Figure 21. Internal dimensions – 2420, 4220, 4820 (leveling foot/minimum clearance)

Figure 22. External dimensions – 4820D rack enclosure

Figure 23.   External dimensions – 4220D rack enclosure

Note: For Detail A, Detail B, and Detail C views, see Figure 25.

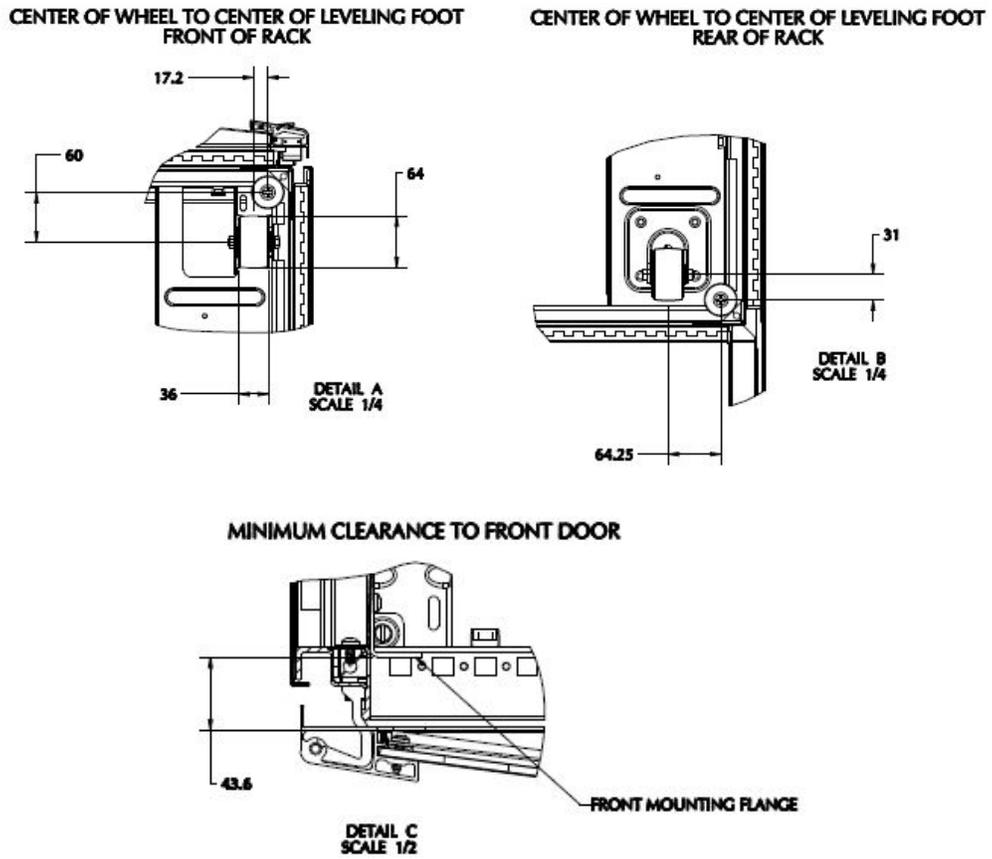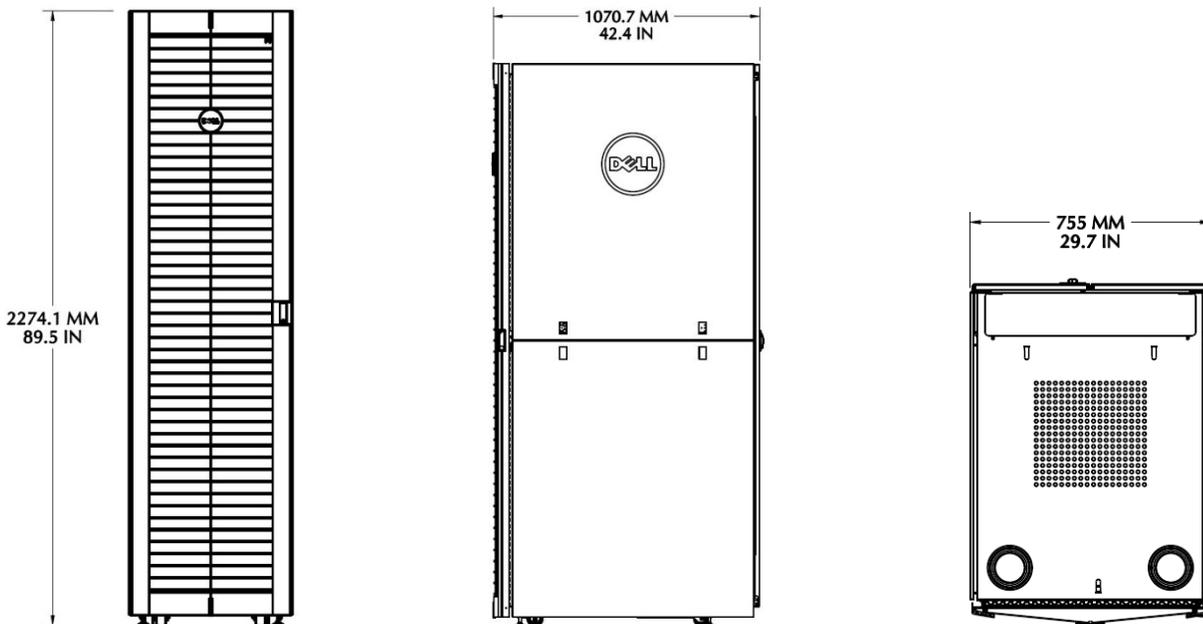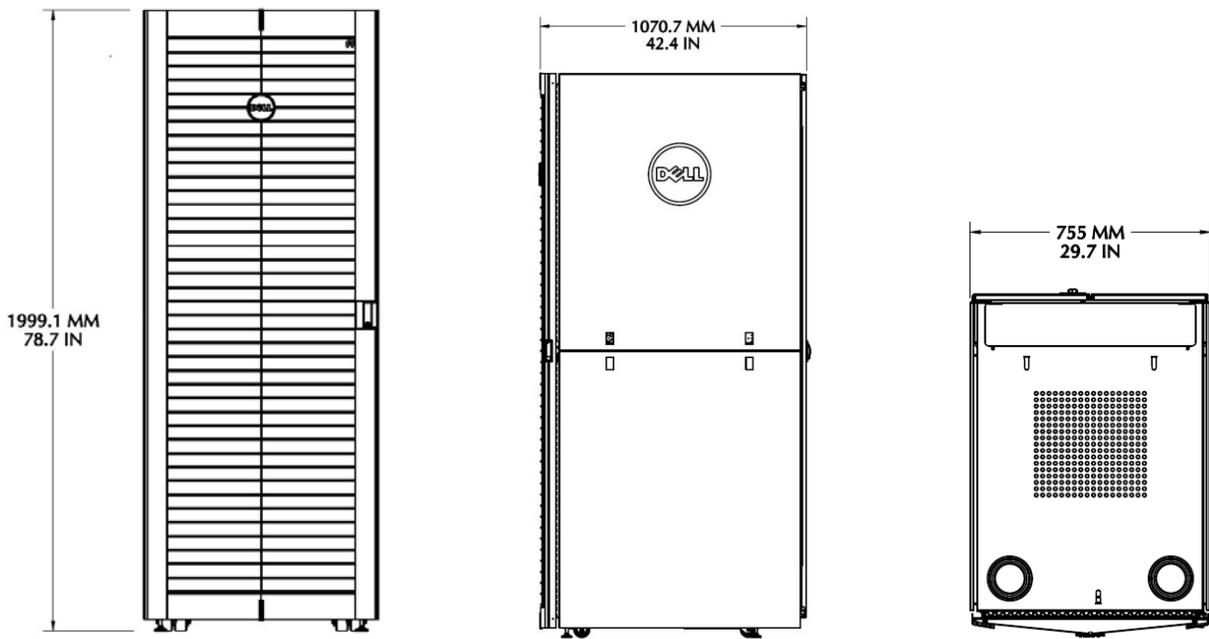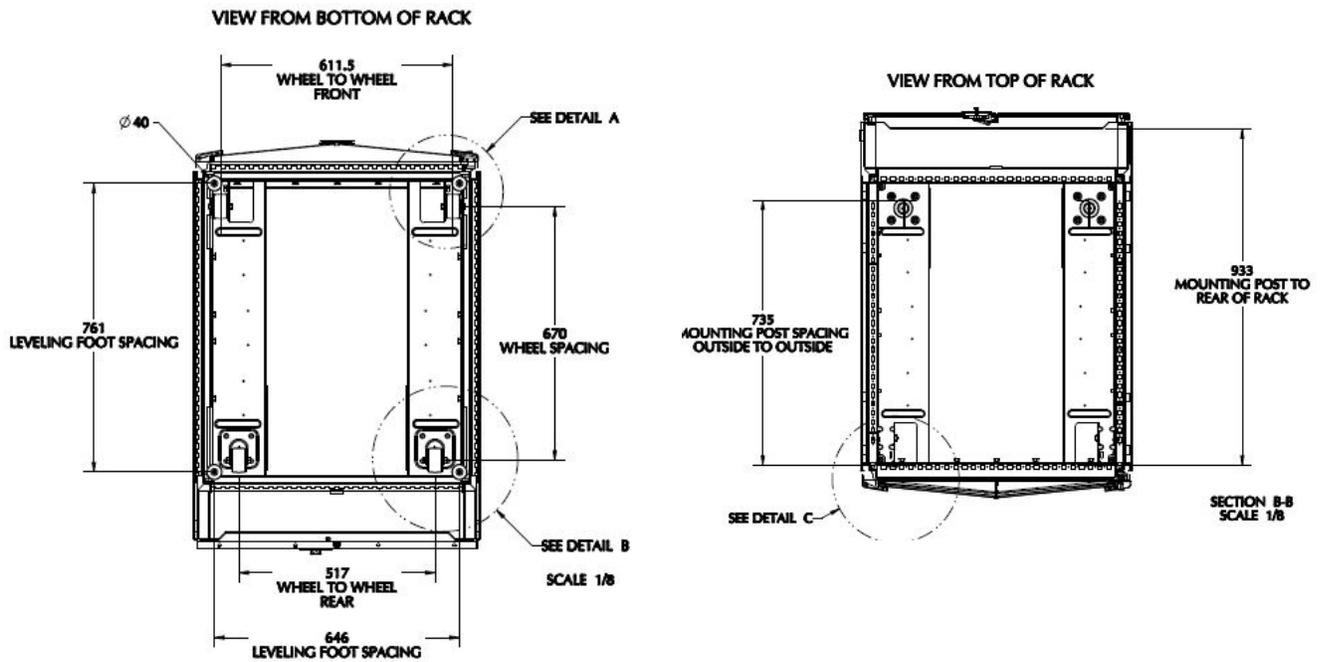**Figure 24.   Internal dimensions – 4220D and 4820D (top and bottom views)**

CENTER OF WHEEL TO CENTER OF LEVELING FOOT
FRONT OF RACK

17.2

60

64

36

DETAIL A
SCALE 1/4

CENTER OF WHEEL TO CENTER OF LEVELING FOOT
REAR OF RACK

31

DETAIL B
SCALE 1/4

64.25

MINIMUM CLEARANCE TO FRONT DOOR

43.6

FRONT MOUNTING FLANGE

DETAIL C
SCALE 1/2

Figure 25.   Internal dimensions – 4220D and 4820D (leveling foot/minimum clearance)

2274.1 MM
89.5 IN

1070.7 MM
42.4 IN

755 MM
29.7 IN

Figure 26.   External dimensions – 4820W rack enclosure

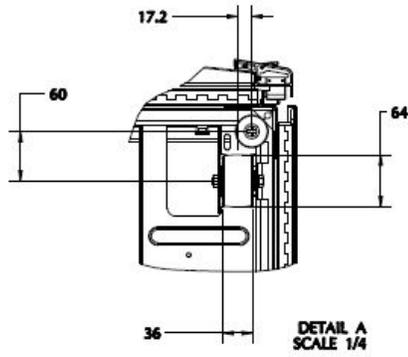**Figure 27.   External dimensions — 4220W rack enclosure**
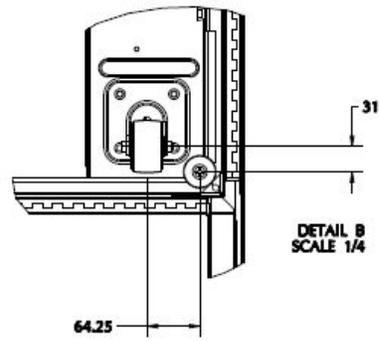

Note: For Detail A, Detail B, and Detail C views, see Figure 29.

Figure 28.   Internal dimensions — 4220W and 4820W (top and bottom views)

CENTER OF WHEEL TO CENTER OF LEVELING FOOT
FRONT OF RACK

17.2

60

64

36

DETAIL A
SCALE 1/4

CENTER OF WHEEL TO CENTER OF LEVELING FOOT
REAR OF RACK

31

DETAIL B
SCALE 1/4

64.25

MINIMUM CLEARANCE TO FRONT DOOR

43.6

DETAIL C
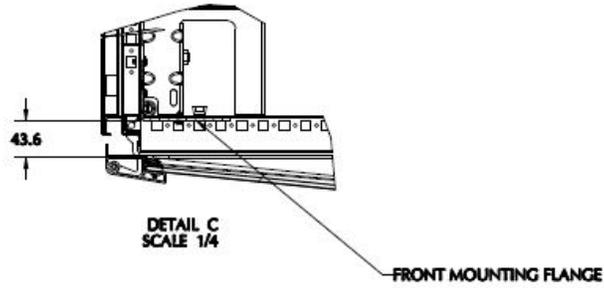SCALE 1/4

FRONT MOUNTING FLANGE

Figure 29.   Internal dimensions – 4220W and 4820W (leveling foot/minimum clearance)

Appendix A. Regulatory certifications

The Dell rack enclosure meets the requirements of the Underwriters Laboratories (UL) Standard 60950-1 when properly installed according to the instructions provided in the *Rack Installation Guide*. The stabilizer feet help prevent the rack from tipping over when a system or other component is pulled out of the rack with the slide assemblies fully extended. Before installing systems in a rack, install front and side stabilizers on stand-alone racks or the front stabilizer on racks joined to other racks using the interconnect kit. Failure to install stabilizers accordingly before installing systems in a rack could cause the rack to tip over, potentially resulting in bodily injury under certain circumstances. Therefore, always install the stabilizers before installing components in the rack.

Dell racks meet the specifications of American National Standards Institute (ANSI), Electronic Component Association (ECA) Standard EIA/CEA-310-E, International Electrotechnical Commission (IEC) 60297-3-100, and Deutsche Industrie Norm (DIN) 41494 for rack-mounting of equipment.

Appendix B. Documentation and resources

A single *Rack Installation Guide* is provided in the packaging for all Dell rack enclosures. Please refer to this document for details on removing and replacing the doors and side panels.

You can also find rack installation guides and helpful white papers at the following location: http://support.dell.com/support/edocs/systems/racks/en/index.htm. Table 8 provides a comprehensive list of rack enclosure documentation.

Table 8.   Additional resources

Resource	Description of contents	Location
Dell Energy Smart Solution Advisor (ESSA)	This website helps IT professionals plan and tune their compute and infrastructure equipment for maximum efficiency. Offering a wide range of configuration flexibility and environmental inputs, the tool can help right-size your IT environment.	http://www.dell.com/calc
Dell online configurator	With the help of the Dell online configurator, it is easy to select the best model from the Dell UPS family.	http://www.dellups.com
Dell PowerEdge rack enclosure documentation	There are three rack enclosure installation guides available: • *Dell PowerEdge Energy Smart Rack Installation Guide 4020S/4620S* • *Dell PowerEdge Rack Installation Guide 4220/4820* • *Dell PowerEdge 2420 Rack Installation Guide*	
Dell rack enclosure accessories	• *Placing the Service Tag (Service Label) on Your Rack* • *Coupling Two Dell PowerEdge 4220 Racks* • *Installing Rack Stabilizer Feet* • *Rack Mounting Equipment Shelf*	http://support.dell.com/support/edocs/systems/racks/en/index.htm
Legacy Dell PowerEdge rack documentation	• *Dell PowerEdge 2410/4210 Installation Guide* • *Installing the Optional Fan Kit in a Dell PowerEdge 4210 Rack*	
Engineering Briefs	• *Best Practices Guide for Rack Enclosures* • *Site Planning Guide* • Cabling PowerEdge racks (listed by server model)	