Standard Features and General Specifications

Model PBSE24 BladeVault™

Air-cooled acoustic blade server rack enclosure v2.2

Kell Systems BladeVault is specifically designed to house a complete office IT installation comprised of a partly- or fully-configured **IBM BladeCenter S™**, **HP BladeSystem c3000™** or **Dell PowerEdge 1955™**, plus UPS, network hardware and peripheral devices.

BladeVault is compatible with many other blade server systems, subject to thermal load. Please consult with your Kell representative if you have another type of blade server system.

BladeVault enables deployment of blade servers and their related network hardware directly in the office workspace, doing away with the need for a dedicated computer room. It combines extreme noise reduction and very high thermal capacity with exceptional reliability and a truly all-inclusive, plug-and-play specification. A host of unique, installer-friendly features ensure quick and easy systems deployment and the PSE's office-quality appearance blends seamlessly into any office environment.

Physical capacity:	**24 rack spaces**
Noise reduction:	**18.5 dB**
Max. recommended thermal load:	**4.3 kW (14,700 BTU / hr)**
Integrated power distribution:	**14 x surge-protected outlets in 2 separate arrays of 7**
BladeVault power consumption:	**84 Watts**

Pictured here in Kell Systems Light Oak effect laminate finish. A wide range of laminate and real wood finishes are available.

Mounting conventional servers in Kell Systems BladeVault

BladeVault contains a fully EIA-compliant 19" four-post rack with adjustable depth (please see later in this guide for full details). It is compatible with low-form-factor server rails from major manufacturers including HP, Dell, IBM, Apple etc.

Provided that the maximum recommended thermal load is not exceeded, BladeVault may be used to house blade servers, low-form-factor servers or combinations of different server types.

Most tower servers can be accommodated also, using Kell static server runners, Kell part code BVSSR.

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External dimensions:	Height 1400 mm / 55.1” x Width 750 mm / 29.5” x Depth 1280 mm / 50.4”
Weight:	176 kg / 388 lbs
Weight load capacity:	600 kg / 1,300 lbs maximum weight of equipment in rack
Physical rack capacity:	24 x EIA 1¾” / 44.5 mm rack spaces 4-post rack, fully EIA-compliant, with fixed rear posts and adjustable front posts Rack depth 755 mm / 29.7”, adjustable down to 675 mm / 26.6” *(No baying kit option available)* Note on mounting of blade server chassis and UPS: BladeVault is supplied as standard with 2 x sets of Kell Systems universal static support rails for use with these devices. These rails replace any supplied by the device manufacturer and will accept a blade server chassis or rack-ready UPS with a depth of up to 850 mm / 33.5”. Specific guidelines on whereabouts in the rack to locate a blade server chassis and UPS for best thermal and acoustic performance may be found in page 7 of this guide.
Extra internal cabinet depth:	Rearward of the rear rack posts: 275 mm / 10.8” except where fan modules intrude.
Floor space requirements:	Individual cabinets are designed to be pushed back flush against a wall. An air space of 500 mm / 20” on both sides of the cabinet is essential for normal operation.
Baying cabinets together:	Unlike the Kell Systems PSE range of enclosures, due to air path design constraints there is no baying kit option available for the model PBSE BladeVault.
Air flow system:	2 x Kell Systems ultra-low-noise exhaust fan modules. 4.3 kW maximum recommended total thermal load (or 14,700 BTU / hr).
Effect to server temperatures:	Provided installation guidelines are followed (please see page 7 of this guide) and maximum recommended thermal load is not exceeded, BladeVault will make little or no difference to server CPU temperatures versus operation in free air space.
Power consumption:	84 Watts total power consumption by BladeVault itself, including cooling system.
Noise of BladeVault itself:	45.5 dBA total noise generated by BladeVault, measured at 1.0 m / 39” in front.
Noise reduction:	18.5 dB broadband noise reduction, measured at 1.0 m / 39” in front. (*IBM blade servers used as noise source in noise reduction measurements)*
Mobility:	4 x heavy duty castor-type wheels. Front wheels have 360° rotation for steerability. Rear wheels have fixed front-to-back motion for stability.
Rear and side access:	Detachable rear side panels, left and right, for installation and maintenance access. Detachable rear fan module backplane gives completely open rear rack access.
Cable management:	100 mm / 4” width full-height vertical cable trays to each side of middle of rack . 100 mm / 4” width full-height vertical cable trays to each side of rear of rack. *(*Option for pack of vertical cable management loops for installation in upper section of front of rack, part code BVCM1)
Dust filtering:	Detachable, washable dust filters fitted as standard to all air intakes.

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Standard Features and General Specifications (continued)

Internal power distribution:

BladeVault is supplied as standard with 2 x separate banks of 7 power outlets, arrayed vertically on either side of the rack. Each bank of power outlets has a separate trailing lead. All power outlets feature surge protection.

UK & Europe: 2 x 7 x IEC 320 C13 (10 A / 220/240 V)

USA/Canada: 2 x 7 x US NEMA 3 pin sockets

Rest of world: 10 x IEC 320 C13 unless specified otherwise

PSE power input connection:

BladeVault has 2 x power inputs via an IEC 320 C14 (male) trailing lead for connection to an in-rack UPS, and 2 x extension cables for connection to wall outlets. User may choose the preferred way to connect. Extension cables are:

UK: IEC C13 female trailing socket to standard UK 3-pin plug

Europe: IEC C13 female trailing socket to Schuko 3-pin plug

USA/Canada: IEC C13 female trailing socket to standard US 3-pin plug

Custom: IEC C13 female trailing socket to any user-specified 3-pin plug

Grounding/Earthing:

All equipment installed within a Kell Systems BladeVault should have conventional grounding/earthing via power cables, but unlike conventional metal-case cabinets, BladeVault has no requirement for additional grounding/earthing in the form of ground strapping or pipe earthing etc. The cabinet shell is constructed entirely from non-conductive materials and the rack is completely isolated from outside contact.

Anti-static measures:

No anti-static measures are required in a Kell BladeVault installation. The rack has full electrical isolation and is not susceptible to static build up that can originate in conventional metal racks by contact with artificial carpet or other flooring materials.

Door locking:

Key operated lock
Option for high security code-entry lock, part code CEL1

Standards compliance:

Electrical systems meet or exceed BS EN 60950:2000, BS 5733:1995 and ISO 9001-2000 and are compliant ROHS Directive 2002/95 and UL60950-1 (USA).

Electronic subsystems meet or exceed EN 60950-1:2006 'Information Technology Equipment – Safety, Part1: General Requirements' and EN292: Part 1: 1991 'Safety of machinery -basic concepts, general principles for design'. Electronics subsystems are CE- certified, certificate number FTE4412GFM-M00 CE, and are compliant with harmonised international standards IEC60950-1:2001 and UL60950-1 (USA).

Acoustic foams meet or exceed UL94-HF1 'Standard for Tests for Flammability of Plastic Materials for Parts in Devices and Appliances', (USA) and acoustic barrier materials meet UL94-V0 (USA). Multi-layer composite acoustic materials meet UL94-V0 (USA) and UL94-V2 (USA). Flammability ratings meet or exceed requirements in BS 60950-1:2002 'Information Technology Equipment - Safety' and harmonized international equivalent standards EN60950-1:2001 and IEC60950-1:2001.

Delivery:

BladeVault is designed to pass through a standard-size doorframe and are normally delivered fully assembled and ready to use. BladeVault can be broken down into component parts where access conditions are constrained. Please consult your Kell Systems representative for details of delivery options in your area.

Warranty:

1 year general warranty against defective workmanship, inclusive of parts and labour
3 years warranty on fan systems up to and inclusive of free replacement

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Noise reduction performance

Server noise attenuation: 18.5 dBA broadband noise reduction, measured 1.0 m / 39" in front of the cabinet
(Representing the elimination of 98.5% of server noise)

Practical explanation:

The field of acoustics is not an area familiar to many IT managers and therefore the following guidelines are offered.

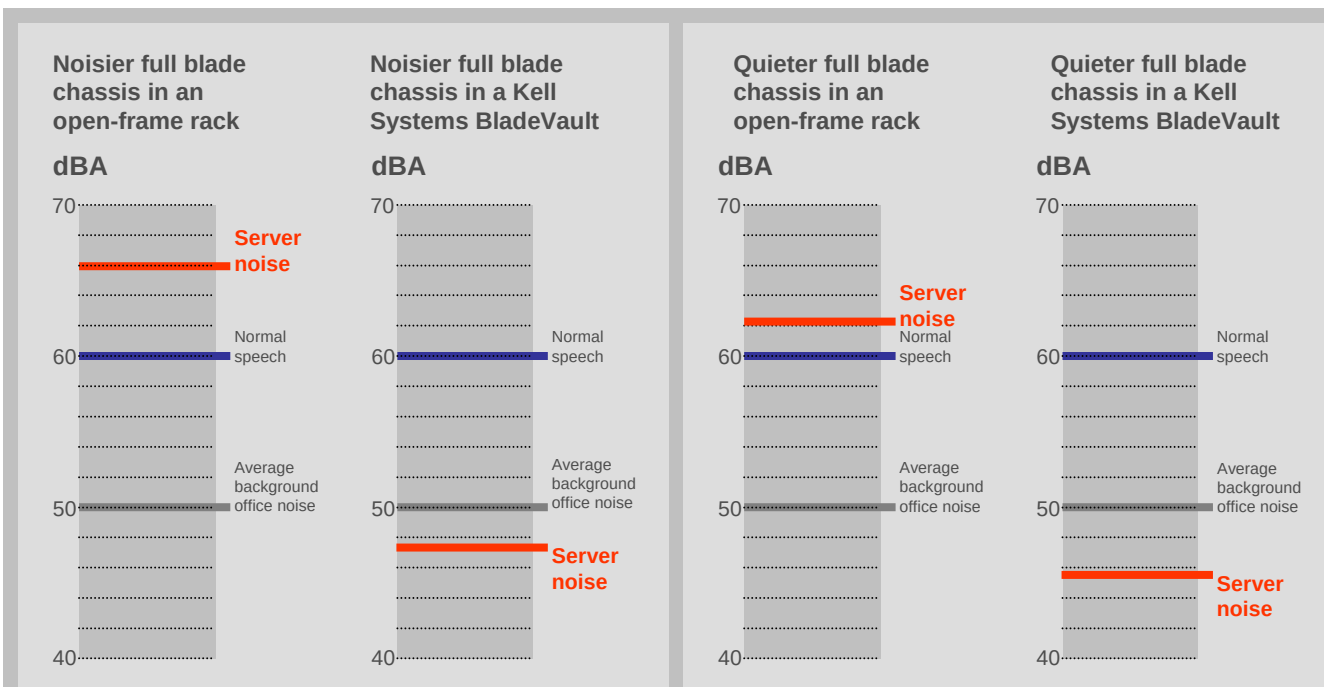
"dBA" is the common measurement unit used to quantify Sound Pressure Level (SPL), which is technical terminology for "how loud things are". As usual with these things, there's no need for the end user to fully understand dBA. The things that matter are how many or how few of them there are, and what that means in the real world. For reference, here are some widely-accepted examples of SPL ratings that are relevant when installing servers in the workplace:

50 dBA	Background noise in an average office, without speech
55 dBA	Background noise in a busy office, without speech
60 dBA	Normal conversational speech
45 to 50 dBA	Typical noise from fully integrated or cassette-type building air conditioning
55 dBA +	Typical noise from portable air conditioners
62 to 66 dBA*	Typical noise (Sound Pressure Level) of a fully-configured blade server chassis with average CPU loads

*Note that these figures are not derived from any specific manufacturer. Manufacturers give out little hard data and prefer to quote relative comparisons to each others product noise levels. Where specific noise levels are quoted, it is normally with CPUs idling and at favourable ambient air temperatures, causing the chassis fans to spin at their slowest. The figures used here originate from Kell Systems own real-world test and measurement experiences.

In order for an installation to become unobtrusive in an office environment, the noise from the servers and other hardware in must be reduced to a level below that of the general office background noise. At such reduced levels, the human brain perceives the noise from the servers as part of the overall background noise, and it will go unnoticed on a day-to-day basis, in much the same way that the hum from most built-in office air conditioning systems do.

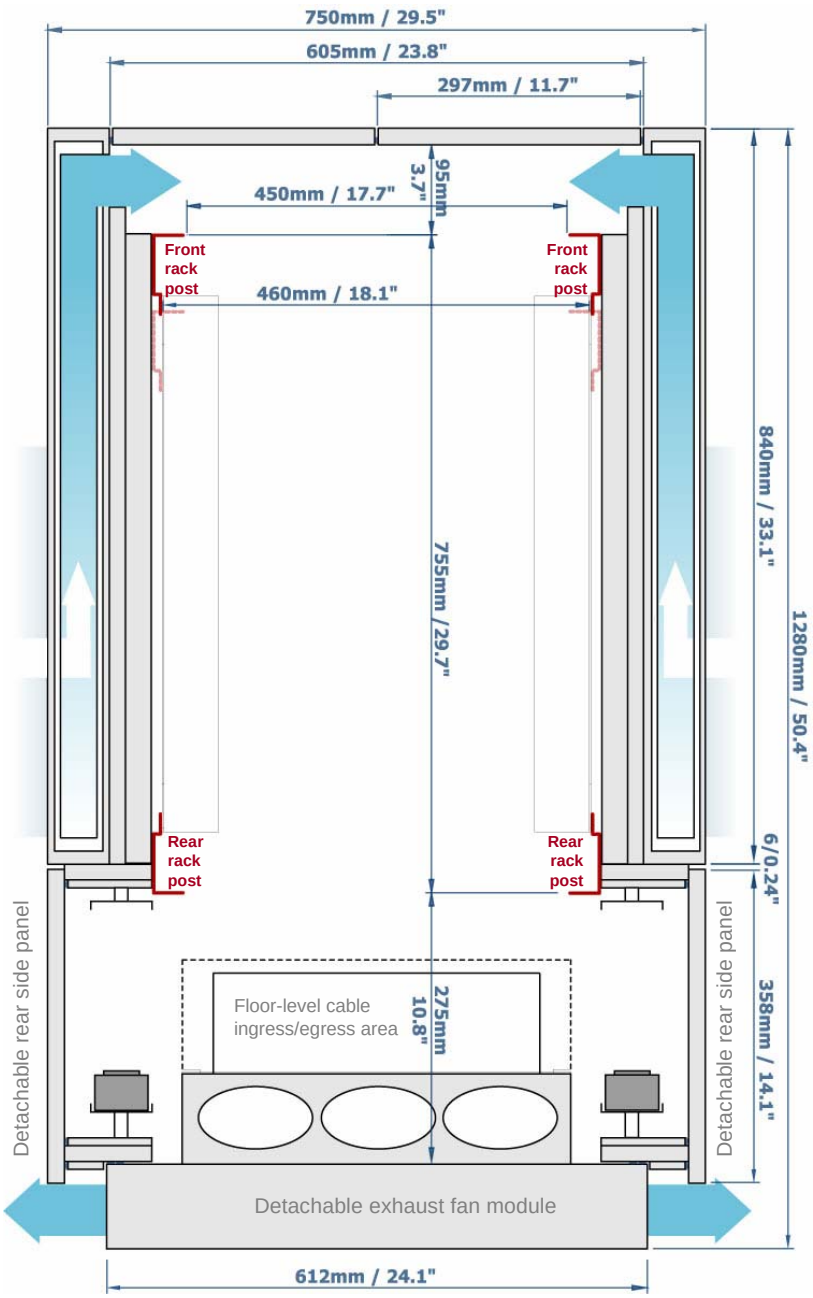
The following tables give a guide to how this is achieved by the use of Kell Systems PSE enclosures.



Kell Systems model PBSE24 BladeVault: detailed plan section

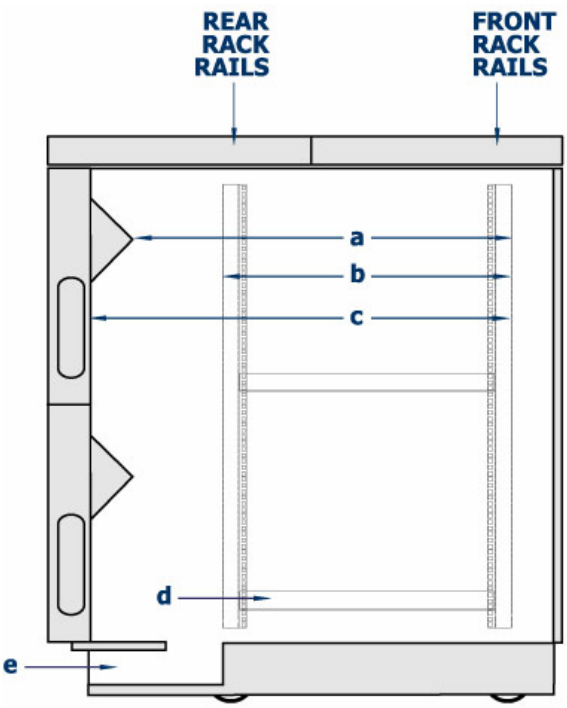
Air paths

FRONT



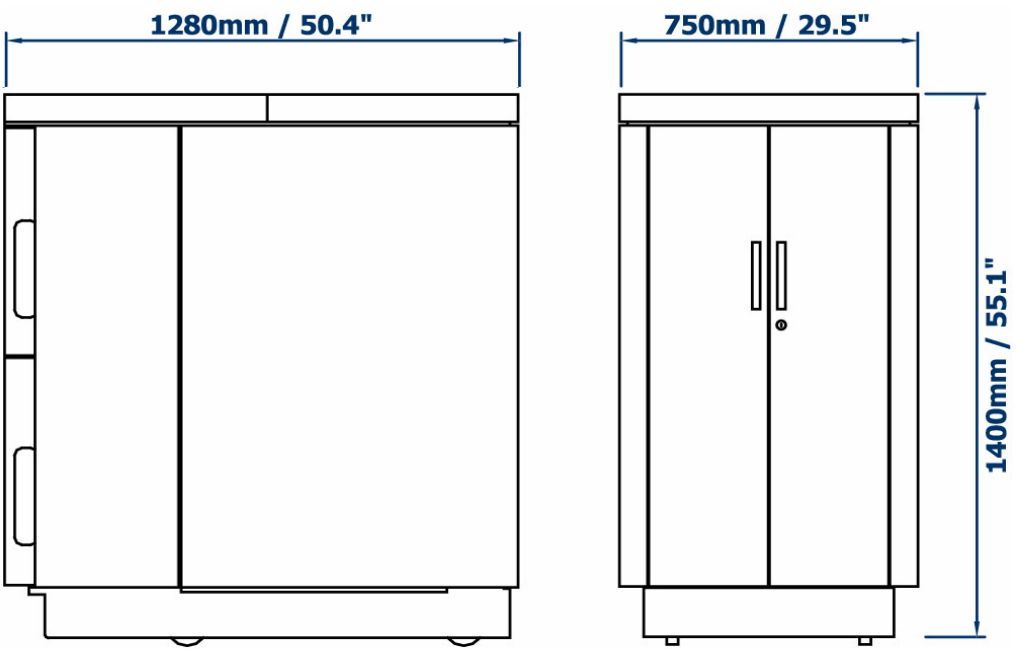
REAR

Kell Systems model PBSE24 BladeVault: side section



a) 950mm/37.4"
b) 755mm/29.7"
c) 1030mm/40.5"
d) static support rails
e) cable egress port

Kell Systems model PBSE24 BladeVault: external views



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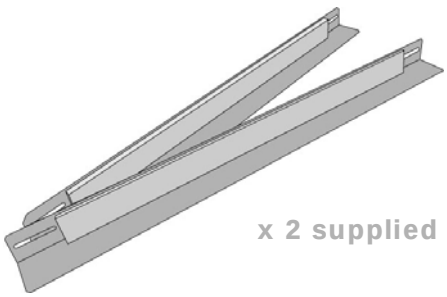
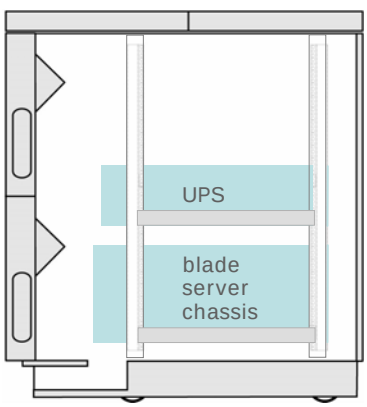
Installation guidelines



BladeVault is supplied with two sets of Kell static support runners, pre-installed in specific locations as recommended for positioning of a blade server chassis and a UPS. These L-shaped profiles link the front and rear rack posts on either side of the rack and provide front-to-back shelf-like support. Blade chassis' and UPS may come as standard with similar fixtures but Kell recommends to discard those and use the Kell-supplied runners to ensure compatibility.

The Kell pre-installed runners are mounted in the positions as noted below, for best thermal and acoustic performance. However they are easily detachable and may be re-mounted to provide support to any rack space in the BladeVault rack.



BladeVault rack posts have clearly numbered rack spaces for ease of installer use, with spaces numbered 1 to 24 in ascending order (the lowest space in the rack is space 1).

The Kell pre-installed runners are mounted to support rack units 2 and 10. It is intended that the blade chassis should rest on this lower set of runners, occupying rack units 2 to 8 inclusive (6U chassis) or 2 to 9 inclusive (7U chassis). The UPS should then rest on the upper set of runners, occupying rack spaces from 10 upwards according to the rack height of the specific UPS in use. In any case the spaces directly above and below the blade chassis should be left empty.

It is acknowledged that it has been the convention to mount the UPS as the lowest device in the rack, due to its weight. However installers should note that a fully configured blade chassis will normally weigh significantly more than its UPS.

Notes on the use of blanking panels

Empty rack spaces should be covered off with blanking panels to prevent recirculation of warm air. Kell offers Hotlok™ blanking panels in 1U and 2U sizes. These push-fit panels clip into the square holes in the rack posts, requiring no screws, and have edge seals to prevent air leakage between panels.

Notes on installation of switches and patch panels

Where cables need to brought to the front of the cabinet for patching or similar, a brush strip panel or panels should be used, so that the frontal seal of the rack is maintained to the best integrity. Switches and patch panels should be mounted in the upper spaces of the rack, above the UPS. The upper part of the rack has fixing points for an optional set of vertical cable management loops, and a 1U jumper ring panel is available as an accessory for horizontal cable management.

kellsystems
Portable Server Environments

About Kell Systems

Kell Systems has pioneered the design and manufacture of Portable Server Environments (PSEs), the first and only complete cabinet solution for deployment of servers and network hardware directly in the office workplace. Kell PSEs are an award-winning new concept and a very real, self-contained alternative to building computer rooms. Kell Systems is the only company in the world of its kind, and Kell PSEs are exported throughout the world to locations from Bali to Bratislava and from Hawaii to Hong Kong.

Kell Systems Ltd. is a privately-held English company founded in 2003, headquartered in Marlow, Buckinghamshire, with its manufacturing and distribution facility in Frome, Somerset.

Kell Systems Inc. is a subsidiary company of Kell Systems Ltd, with offices and showrooms in Chantilly, Virginia (Washington D.C. area). Kell Systems Inc. warehouses inventory and manages its own distribution operations in the USA.

Kell Systems (Vertrieb Deutschland) is Kell Systems' sales office in Germany and Kell Systems (Ventas España) is Kell Systems' sales office in Spain.

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Kell Systems has also exported to overseas destinations including:

Australia :: Austria :: Belgium :: Canada
China :: Czech Republic :: Denmark
Estonia :: France :: Gibraltar :: Hawaii
Hong Kong :: Hungary :: India ::
Indonesia :: Ireland :: Italy :: Japan
Kuwait :: Latvia :: The Netherlands
Norway :: Portugal :: Russia
Slovakia :: Switzerland :: Turkey :: UAE

Kell Systems' Ashton Park manufacturing facility