Excel Power Distribution

www.excel-networking.com/power

Section 14

Power Distribution Units

Power Distribution Units (PDUs) are an important and often overlooked part of an infrastructure design and installation. At their simplest they deliver the power required for the equipment within the rack, more advanced units can provide management information on power consumption and local environmental conditions such as temperature and humidity. It is important to consider the PDU requirement at the rack installation stage rather than as an afterthought at the equipment installation stage. Making sufficient provision for the power will ensure the longevity and best use of the rack.

PDUs can be fitted in various different ways within the rack: front; rear; horizontal rack mount; vertical side mount. This may be dependent on –

- Available space in the rack
- Position of equipment
- Position of the power input for specific equipment

What capacity and how many PDUs should there be? For a rack that will be dedicated for equipment consideration should be made for dual power supply. In this case at least two PDUs will be required to provide the primary and secondary power supplies. This is typical for data centre and high importance communication rooms. Where racks are used to serve smaller locations and house a mixture of equipment and cabling then the requirement may be less. However, as networks and installations evolve over time the requirements change.

There are a variety of types of sockets including IEC C13 & C19 type used throughout the world. Additionally there are country specific types, such as the UK (BS1363), Schuko and NFC French styles.

Excel has Standard, Monitored and Managed PDUs to suit all requirements.

Please be advised that Excel's Modular Power Distribution Units have been discontinued. For further information, please speak to your sales representative or contact our team via email: sales@excel-networking.com

NEW for V5

Efficiency Measurements

The more energy that is used in a data centre (or other facility) results in higher bills. These account for major ongoing costs in operation. Efficiency measurements are required to establish the performance of the data centre. Depending on the organisation or current trends these can be carried out in many different ways. BS EN50600 lists a number of KPIs to measure the efficiency of a data centre, amongst them two of the simpler ones are PUE and DCIE. They make the same comparison expressed in different ways.

Power Usage Effectiveness

Power Usage Effectiveness (PUE) compares the energy used directly for the computer equipment with the total power used in the facility. The calculation is a simple formula:

$$PUE = \frac{Total\ Facility\ Energy}{IT\ Equipment\ Energy}$$

Total Facility Energy is a measure of all energy used including that consumed by the IT equipment. This includes, measuring the energy consumed as electricity, gas etc. *IT Equipment Energy* only relates to the energy used for the direction operation of the equipment. All energy measurements must be in the same units (or converted), for example kWh (kilowatt hours).

The resulting number does not have units. The aim is to reduce the PUE, with a PUE of 1 meaning only the IT Equipment uses energy. The typical PUE is difficult to quantify. However, the aim should always to be below 2.

Data Centre Infrastructure Efficiency

Data Centre Infrastructure Efficiency (DCIE) is the inverse of PUE and is expressed as a percentage. Therefore the formula is:

$$DCIE = \frac{IT\ Equipment\ Energy}{Total\ Facility\ Energy}$$

Using and recording the information that is supplied from the Excel Intelligent PDUs can help calculate the IT Equipment Energy usage, which in turn allows the PUE or DCIE to be calculated. Once the baseline figure is calculated steps can be put in place and the improvements may be measured.

Excel Standard PDUs

The Excel Standard PDUs are available in a variety of sizes and socket types. The horizontal PDUs have the mounting brackets at the front to allow attachment to the 19" profiles. The vertical PDUs have the mounting brackets at the rear to allow mounting to single 19" profile, side supports or flat surface. Note that vertical PDUs are sometimes referred to as Zero U, due to mounting outside of the vertical equipment mounting rails.

A range of input connectivity plugs are available to support different installation environments. The IEC 60309 "Commando style" plugs are utilised in Data Centres and other locations where the total current load for the PDU will exceed the standard domestic plug rating (UK BS1363, Schuko, French NFC. etc). It is becoming more common in rack installations to use either the C13 or C19 IEC output sockets. Within the range there are also PDUs with C14 and C20 Input Plugs so that a PDU may be connected direct to a rack mounted UPS (Uninterruptible power supply).

Part Number	No. of Sockets	Switched	Filtered	Mounting Orientation	Input Connectivity	Output Connectivity	Voltage	Current Rating (Amps)
D13-4H-EXL	4	✓		Horizontal	C13	C13	250V	13A
D13-5H-EXL	5	✓		Horizontal	C13	C13	250V	13A
D13-6-EXL	6	✓		Vertical	C13	C13	250V	13A
D13-6H-EXL	6	✓		Horizontal	C13	C13	250V	13A
D13-8-EXL	8	✓		Vertical	C13	C13	250V	13A
D13-10-EXL	10	✓		Vertical	C13	C13	250V	13A
D13-12-EXL	12	✓		Vertical	C13	C13	250V	13A
D13-6HF-EXL	6	✓	✓	Horizontal	C13	C13	250V	13A
D13-7HF-EXL	7	✓	✓	Horizontal	C13	C13	250V	13A
D13-8F-EXL	8	✓	✓	Vertical	C13	C13	250V	13A
D13-10F-EXL	10	✓	✓	Vertical	C13	C13	250V	13A
D13-12F-EXL	12	✓	✓	Vertical	C13	C13	250V	13A
D16-6H-EXL	6	✓		Horizontal	C19	C13	250V	16A
D16-8-EXL	8	✓		Vertical	C19	C13	250V	16A
D16-10-EXL	10	✓		Vertical	C19	C13	250V	16A
D16-12-EXL	12	✓		Vertical	C19	C13	250V	16A
D32-8-EXL	8	✓		Vertical	C19	C13	250V	32A
D32-10-EXL	10	✓		Vertical	C19	C13	250V	32A
D32-12-EXL	12	✓		Vertical	C19	C13	250V	32A
555-230	16	✓		Vertical	C19	12 C13 & 4 C19	250V	32A
555-231	20	✓		Vertical	C19	16 C13 & 4 C19	250V	32A
555-232	24	✓		Vertical	C19	20 C13 & 4 C19	250V	32A
D13-6HIEC-EXL	6			Horizontal	C13	C14	250V	13A

Part Number	No. of Sockets	Switched	Filtered	Mounting Orientation	Input Connectivity	Output Connectivity	Voltage	Current Rating (Amps)
D13-6HIECF-EXL	6		✓	Horizontal			250V	13A
D13-8IECF-EXL	8		✓	Vertical			250V	13A
D13-10IEC-EXL	10			Vertical			250V	13A
D13-12IEC-EXL	12			Horizontal			250V	13A
555-240	6	✓		Horizontal			250V	10A
555-241	8	✓		Vertical			250V	10A
555-242	10	✓		Vertical			250V	10A
555-243	12	✓		Vertical			250V	10A
555-245	6	✓		Horizontal			250V	16A
555-246	8	✓		Vertical			250V	16A
555-247	10	✓		Vertical			250V	16A
555-250	6	✓		Horizontal			250V	10A
555-251	8	✓		Vertical			250V	10A
555-252	10	✓		Vertical			250V	10A
555-253	12	✓		Vertical			250V	10A
555-083	8			Horizontal			250V	16A
555-084	9			Horizontal			250V	16A
555-092	6	✓		Horizontal			250V	16A
555-093	8	✓		Horizontal			250V	16A
555-097	6			Horizontal			250V	16A
555-098	8			Horizontal			250V	16A

Click here to view the full range

CONNECTIVITY KEY

- 3 pin - BS1363
- "Commando Style" IEC 60309
- C13 - IEC60320
- C19 - IEC60320
- Universal - GST18
- Schuko
- French
- IEC 60884

NEW for V5

Excel Intelligent PDUs

First in class industry innovation

Excel Networking is a leading provider of high-quality, customized rack power distribution units (PDUs), and related power solutions to meet the unique needs of demanding Date Centre environments and Computer Rooms worldwide. The new IEX PDU has been designed according to the latest global standards and using the latest technology to provide you with the industry's highest availability and smartest power monitoring distribution.

Full capacity all the time

The new IEX socket is a combination of IEC 320 C13 and IEC 320 C19 sockets that allows you the full usage of the PDU, all of the time. If you change or upgrade the rack equipment and it means different input plugs, no problem. The IEX socket accepts the IEC 320 C14 and IEC 320 C20 plugs from your servers or UPS to any outlet socket on the PDU.

Features

- IEX (C13/C19) all in one combo socket makes the PDU the most versatile, coping with any combination of C14 and C20 plugs.
- PDU cascading allows full control of up to 16 PDUs from one Primary/Master PDU, simplifying the number of IP addresses required.
- Multi-colour OLED illuminated screen display offering high contrast power usage and alarms.
- Built with high-temperature grade components to allow safe and reliable operation in hot 60ºC (140ºF) environments.
- Alternate branch wiring on 3phase systems helps power load balance.
- Full outlet control for remote On/Off or a timed reboot individual outlets or group of outlets to improve the operation uptime.
- Dual 1GB ethernet port for third party access to the PDU.
- IEX lock standard power cord retention and P-Lock and V-Lock power cord compatibility.

excel
without compromise.

Secure Locking Outlets

EXCEL intelligent rack PDUs are equipped with lockable outlets preventing power cords accidently coming unplugged due to human error or vibration.

Interoperability with third party software

If you need to centrally manage all PDUs in your data centre we offer all communication protocols. Our solutions offer the option to communicate the status of rack-level power and environmental information to any third party Datacentre Infrastructure Management (DCIM) solution

Field-Replaceable Controller

The hot-swappable onboard controller, ensures that servers will never experience downtime when maintenance in the Data Centre is required and ensuring the infrastructure will never be obsolete being update ready.

Power Share Fail Over

Maintain the PDU sending alarams and network conectivitiy in case one of the PDUs in same rack loose power feed

Redundant Network Connections

World's first double Gigabit ethernet port PDU ensures monitoring reliability and allowing to be shared with Data centre management and end clients in one or two separate Networks

Security

EXCEL PDUs support the most stringent security protocols in the market in order to prevent unauthorized access (256 bit AES encryption, Radius, SNMPv3, user permissions, SSHv2, SSL, HTTPS).

Hydraulic-magnetic Circuit Breakers monitoring

Built with highly reliable hydraulic-magnetic circuit breakers which are not affected by ambient temperature and support delay curves appropriate for IT-equipment. The PDU proactively monitoring the status of the breakers in order to prevent downtime due to server power supply failure or overloads, sending an alert for any high load that risk a tripped circuit.

Full Color Range

Coloured PDUs make it easier to reduce human errors, identify power feeds, lowering the risk of unplanned downtime, EXCEL PDUs are available in any RAL-colour.

Energy Efficient Latching Relays

Uses energy efficient bi-stable latching relays. These relays consume up to 70% less energy than alternatives, making outlet switching safer and configured in such a way that the outlet power distribution is always maintained.

OLED display

Shows Input power parameters and scroll individual outlet (V,A,PF,W,KWxH). Screen turns its orientation according PDU position.

Accurate Environment Monitoring cascading sensors EMD

The sensors benefit from the latest, most high-tech metering components, delivering the highest metering accuracy for temperature and relatve humidity. Each sensor is built with 2 additional digital input contacts for (water leak, door contact, motion, vibration, smoke and any other sensor with normally open or closed). Sensors can be deployed in cascade up to 8 EMD sensors using network cables.

PDU Cascading Option

In order to save on network ports and manage multiple devices from one IP address we offer the opportunity to daisy chain up to 16 PDUs using Cat5/6 cable.

Kwh Metering Accuracy

Enabling precise allocation of data centre expenses with +/- 1% billing grade accuracy.

High Outlet flexibility and alternating phase

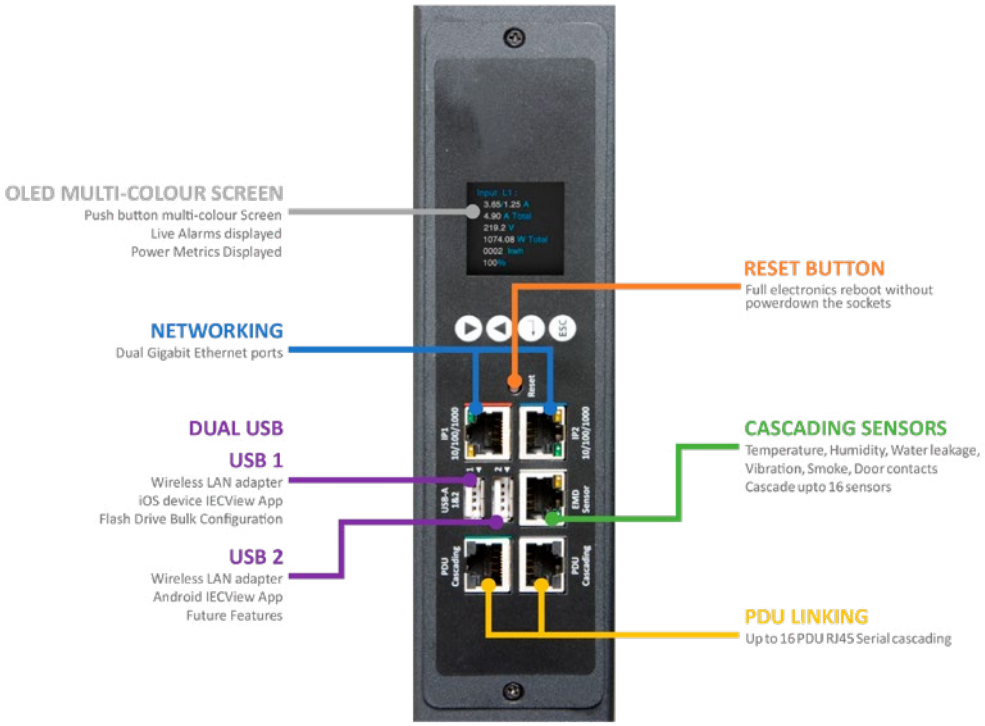
IEX socket is a UL and IEC tested combination of C13 and C19 outlet that accommodates either a C14 and or C20 plug. Alternating phase set up helps on power balance for three phase systems.

RCM Residual Current Monitoring Option

By measuring current flowing in the ground wire, our residual current monitoring by BENDER™ reduces the risk of electric shock. PDUs equipped with residual current monitoring dramatically reduce the burden of regulatory auditing.

Leading in innovation

IEX PDU is manufactured with the the most advanced hot-swap, field replaceable SNMP IP controller. It is built with dual Gigabit Ethernet ports, an OLED full colour screen, cascading multi-sensor ports, enhanced security, sophisticated alarming and power monitoring across the whole power chain.



Never get caught out by changing outlet requirements for equipment changes

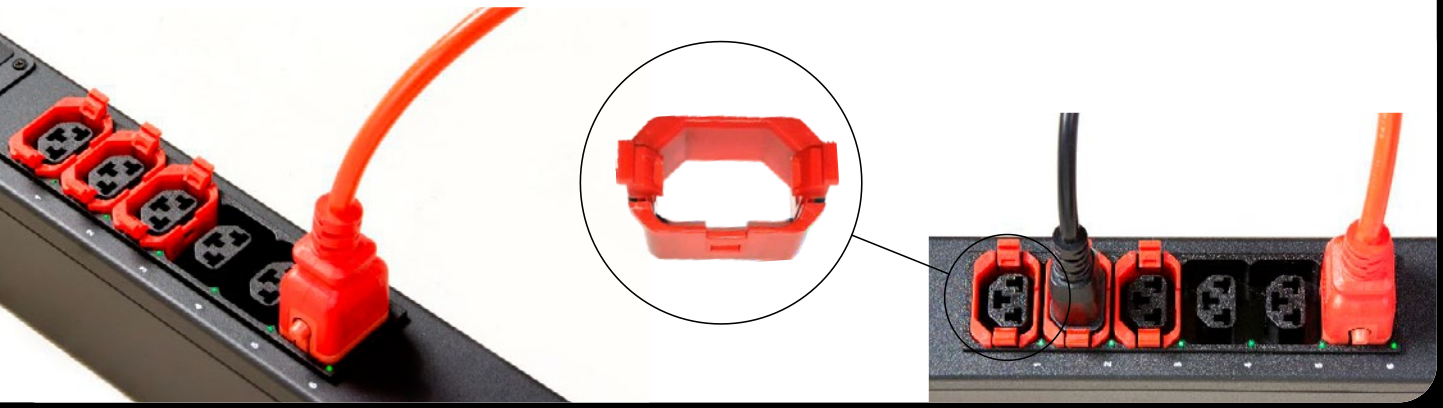
The new IEX socket is a combination of the C13 and C19 outlet standards that gives the maximum flexibility with the ability to hold both C14 and C20 plugs.

Fully patented and backed by IEC/EN and UL safety certifications it brings reliablity in design.

S14

IEX removable locker for C14 plugs and lockable power cords for C20 plugs

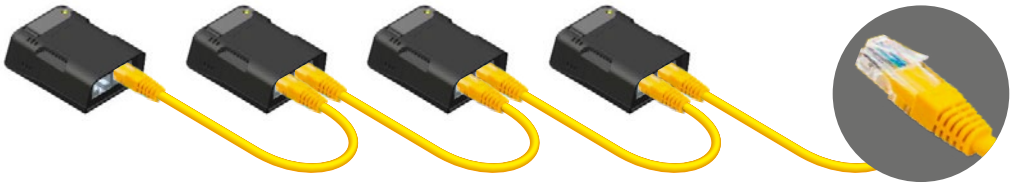
The IEX Lock-VP is a removable component that makes standard C14 plugs lock securely. The C20 Socket design has built in locking compatibly as standard with P-LOCK and V-LOCK plugs.

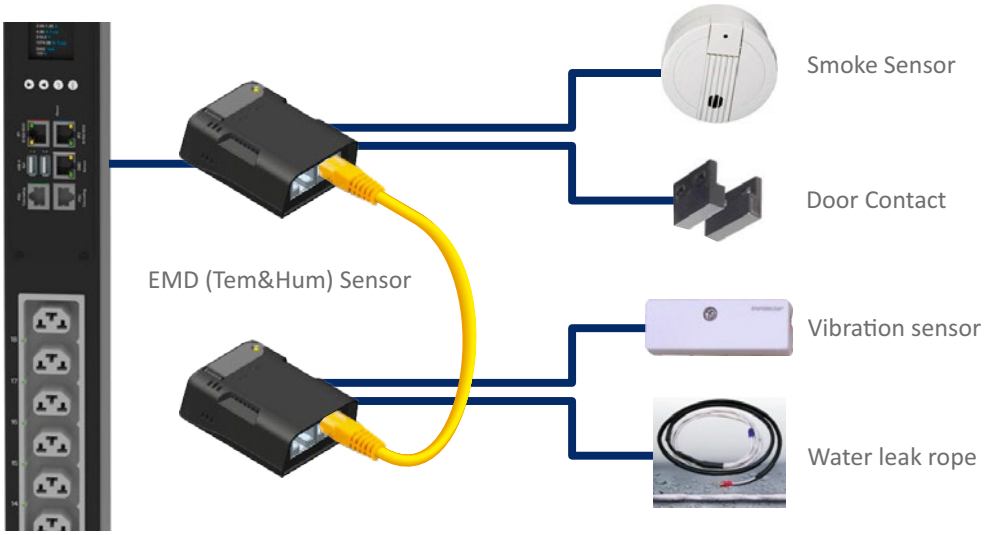


Flexible Environmental Monitoring With Smart Sensors EMD31

The new EMD31 is a environmental monitoring device that allows you to monitor temperature and humidty and status for 2 digital input sensors such (water leak, door contact, motion, vibration, smoke and any other sensor with normally open or closed).

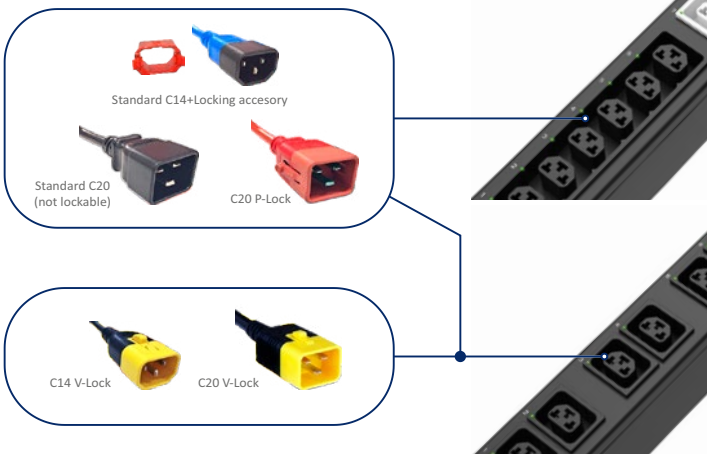
Sensors can be deployed in cascade up to 8 EMD sensors using network cables.





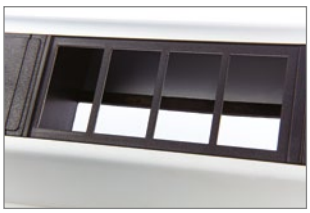
	BASIC	PM (Local Power Meter)	PIML (Per inlet monitoring)	SMART PIM (Per inlet monitoring)	SMART POS (Inlet monitoring + Outlet Switching)	SMART POM (Inlet + Outlet monitoring)	SMART POMS (Inlet + Outlet monitoring & switching)
Mechanical features Ultra light aluminium profile Full adjustable mounting options Low profile hydraulic magnetic breakers 10KA Icn C13/C19 combination socket lockable	✓	✓	✓	✓	✓	✓	✓
Inlet Energy Metering PDU input enery metering kWh PDU input power measurements (W, VA, VAR) PDU input (A, V, PF, HZ) measurments Circuit breaker monitoring Residual current monitoring (optional) 3 phase balance indicator		✓	✓	✓	✓	✓	✓
Securtiy Management Memory logs for historical data and graphics User and alarms tresholds customizable			✓	✓	✓	✓	✓
SNMP Controller PDU cascading (up to 16 PDUs) Hot swappable and replaceable controller Double Gigabit Ethernet port				✓	✓	✓	✓
Outlet control Remote On/Off by individual outlet or groups Power On/Off delay Sequential startup User level security assignable Individual LED x outlet status indicator					✓		✓
Outlet Metering PDU ouput enery metering kWh PDU output power measurements (W, VA, VAR) PDU output (A, V, PF, HZ) measurments						✓	✓
Environmental Metering Environmental sensor (Tem&Hum) cascading (up to 8) Door contact Smoke detection Vibration Motion sensor Water leakage User and alarms tresholds customizable			✓	✓	✓	✓	✓
Network and Security DHCP, IPv4 and IPv6, DNS, http / https, SSHv.2, SNMP, v1 / v2c / v3, SNMP TRAPS / SETS / GETS, SMTP, Modbus , Telnet, TCP, RADIUS, Syslog, TLS 1.2, SNTP			✓	✓	✓	✓	✓

C13/C19 combination outlets compatible Power cords



No. OUTLETS	BASIC	PM (Local Power Meter)	PIML (Per inlet monitoring)	SMART PIM (Per inlet monitoring)	SMART POS (Inlet monitoring + Outlet Switching)	SMART POM (Inlet + Outlet monitoring)	SMART POMS (Inlet + Outlet monitoring + switching)
230V 16A - 1 PHASE							
12	IEX601216AH	IEXPM601216AH	IEXPIML601216AH	IEXPIM601216AH	IEXPOS601216AH	IEXPOM601216AH	IEXPOMS601216AH
12	IEX451216AV	IEXPM451216AV	IEXPIML451216AV	IEXPIM501216AV	IEXPOS501216AV	IEXPOM501216AV	IEXPOMS501216AV
18	IEX451816AV	IEXPM451816AV	IEXPIML451816AV	IEXPIM501816AV	IEXPOS501816AV	IEXPOM501816AV	IEXPOMS501816AV
24	IEX452416AV	IEXPM452416AV	IEXPIML452416AV	IEXPIM502416AV	IEXPOS502416AV	IEXPOM502416AV	IEXPOMS502416AV
30	IEX453016AV	IEXPM453016AV	IEXPIML453016AV	IEXPIM503016AV	IEXPOS503016AV	IEXPOM503016AV	IEXPOMS503016AV
36	IEX453616AV	IEXPM453616AV	IEXPIML453616AV	IEXPIM503616AV	IEXPOS503616AV	IEXPOM503616AV	IEXPOMS503616AV
230V 32A - 1 PHASE							
12	IEXCB601232AH	IEXCBPM601232AH	IEXCBPIML601232AH	IEXCBPPIM601232AH	IEXCBPPOS601232AH	IEXCBPPOM601232AH	IEXCBPPOMS601232AH
24	IEXCB602432AH	IEXPMCB602432AH	IEXPIMLCB602432AH	IEXCBPIM602432AH	IEXCBPOS602432AH	IEXCBPOM602432AH	IEXCBPOMS602432AH
12	IEXCB451232AV	IEXCBPM451232AV	IEXCBPIML451232AV	IEXCBPIM501232AV	IEXCBPOS501232AV	IEXCBPOM501232AV	IEXCBPOMS501232AV
24	IEXCB452432AV	IEXCBPM452432AV	IEXCBPIML452432AV	IEXCBPIM502432AV	IEXCBPOS502432AV	IEXCBPOM502432AV	IEXCBPOMS502432AV
36	IEXCB453632AV	IEXCBPM453632AV	IEXCBPIML453632AV	IEXCBPIM503632AV	IEXCBPOS503632AV	IEXCBPOM503632AV	IEXCBPOMS503632AV
380V 16A - 3 PHASE							
12	IEX601216A3PH	IEXPM601216A3PH	IEXPIML601216A3PH	IEXPIM601216A3PH	IEXPOS601216A3PH	IEXPOM601216A3PH	IEXPOMS601216A3PH
24	IEX602416A3PH	IEXPM602416A3PH	IEXPIML602416A3PH	IEXPIM602416A3PH	IEXPOS602416A3PH	IEXPOM602416A3PH	IEXPOMS602416A3PH
18	IEX451816A3PV	IEXPM451816A3PV	IEXPIML451816A3PV	IEXPIM501816A3PV	IEXPOS501816A3PV	IEXPOM501816A3PV	IEXPOMS501816A3PV
24	IEX452416A3PV	IEXPM452416A3PV	IEXPIML452416A3PV	IEXPIM502416A3PV	IEXPOS502416A3PV	IEXPOM502416A3PV	IEXPOMS502416A3PV
36	IEX453616A3PV	IEXPM453616A3PV	IEXPIML453616A3PV	IEXPIM503616A3PV	IEXPOS503616A3PV	IEXPOM503616A3PV	IEXPOMS503616A3PV
280V 32A - 3 PHASE							
12	IEXCB601232A3PH	IEXCBPM601232A3PH	IEXCBPIML601232A3PH	IEXCBPIM601232A3PH	IEXCBPOS601232A3PH	IEXCBPOM601232A3PH	IEXCBPOMS601232A3PH
24	IEXCB602432A3PH	IEXCBPM602432A3PH	IEXCBPIML602432A3PH	IEXCBPIM602432A3PH	IEXCBPOS602432A3PH	IEXCBPOM602432A3PH	IEXCBPOMS602432A3PH
24	IEXCB452432A3PV	IEXCBPM452432A3PV	IEXCBPIML452432A3PV	IEXCBPIM502432A3PV	IEXCBPOS502432A3PV	IEXCBPOM502432A3PV	IEXCBPOMS502432A3PV
36	IEXCB453632A3PV	IEXCBPM453632A3PV	IEXCBPIML453632A3PV	IEXCBPIM503632A3PV	IEXCBPOS503632A3PV	IEXCBPOM503632A3PV	IEXCBPOMS503632A3PV
42	IEXCB454232A3PV	IEXCBPM454232A3PV	IEXCBPIML454232A3PV	IEXCBPIM504232A3PV	IEXCBPOS504232A3PV	IEXCBPOM504232A3PV	IEXCBPOMS504232A3PV

Excel Desktop Power Distribution Units



Excel **Desktop Power Distribution Units** offer a convenient addition to the work place. Available with either UK or Schuko power sockets and options for 6c apertures to accept data outlets and USB power in a stylish anodised aluminium finish, the PDUs are easily fitted to the desktop with the supplied clamps.

The Excel Desktop PDUs eliminate the need to scramble under the desk to connect up laptop and other power supplies. With the option of the 6c Apertures and the USB power points it increases the flexibility of any work area for the resident or casual occupant.

The USB outlets supply up to 2.1 amps permitting phones and tablets to be charged. An illuminated master power switch is fitted to each PDU. The power leads are supplied separately to ensure that the correct length is selected.

Features

- Desktop mounting
- USB Power Option
- Optional 6c Apertures
- UK or Schuko Power Sockets
- Removable Power Cord
- Illuminated Master Power Switch

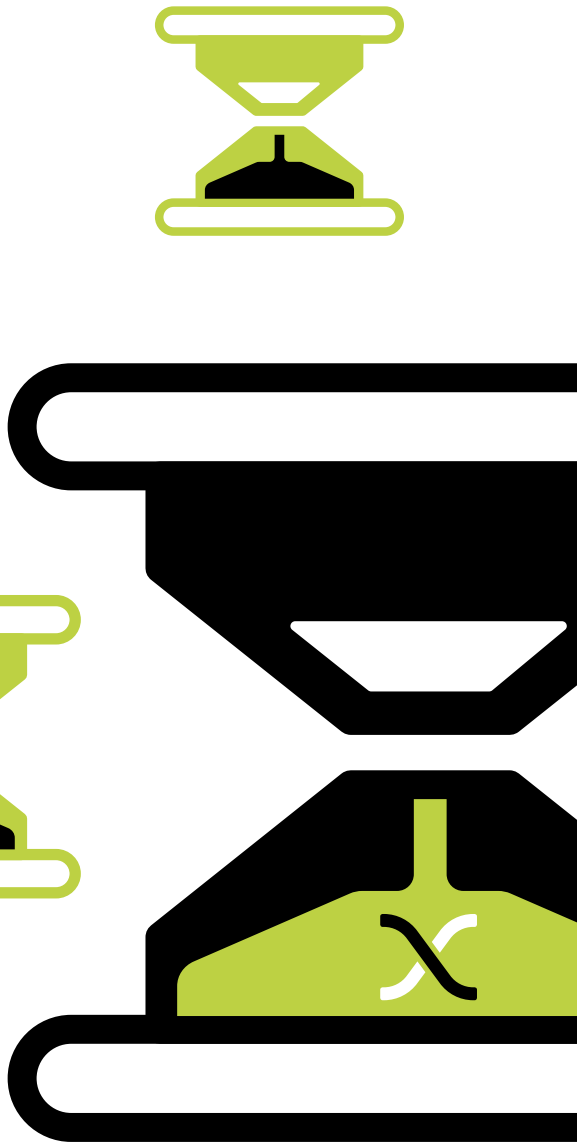
More information online:
https://excel-networking.com/power/desktop-pdus

S14

Head over to Section 13
of the Encyclopaedia
to read more about our
range of Environ Racks

60%

The preparation time you could save by choosing products in plastic free packaging.



At Excel Networking Solutions, we are committed to reducing our impact on the environment. Choosing Excel products in plastic free packaging will not only help to protect the environment, but will also lower installation costs by reducing the on site preparation time (based on comparing 24 x Single Keystone Jacks and 1 x Plastic Free Multipack) by at least 60% - if you don't believe us watch the video at

https://www.excel-networking.com/plastic-free

Save preparation time and help the environment

#BreakFreeFromPlastic **#DoYourBit** **#Choose Excel**

Read Section 2 of the Encyclopaedia for more information.

ZERO Plastic Packaging

excel without compromise.