

Strain Reliefs

pg 6

21 PLUG PATTERNS...AND COUNTING

pg 16

**US IEC SC23G TAG Seeks
Volunteers**

pg 20

**MULTIFUNCTION
POWER ENTRY
MODULES**

pg 22

No Minimum Order Requirements on C5 Cord Sets



Interpower Corporation manufactures a variety of power cords and cord sets with a molded IEC 60320 C5 connector. The Interpower molded IEC 60320 C5 connector is rated up to 250 VAC and 2.5 A for international applications, and up to 125 VAC and 7A for North American Applications. The Interpower line of IEC 60320 C5 power cords and cord sets carry all the necessary approvals including VDE, UL, CSA and NSW Department of Fair Trading.

Customize your cords! Choose from a variety of North American and international molded plugs to complete your cord set. Interpower Corporation also offers custom lengths, labeling, packaging and more upon request. Contact our Customer Service Department from 7 a.m. to 7 p.m. CST to discuss your specific needs.

From 1 to 1,000 pieces or more, we have no minimum order requirements. Interpower Corporation has just a 1-week manufacturing lead time on nonstock power cords and cord sets. In addition, we offer same day shipment for stock item orders received by 6 p.m. CST.

- 1-week manufacturing lead time on nonstock cords
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- Same day shipment available for stock item orders received by 6 p.m. CST
- Custom options available upon request
- Made in the USA

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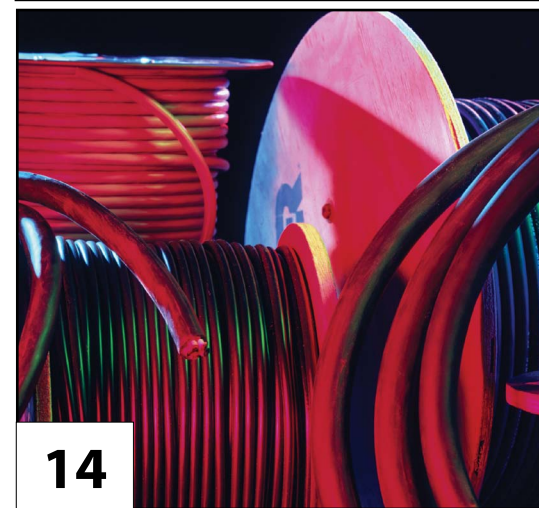
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COVER STORY

6 Strain Relief

The importance and uses of strain reliefs

FEATURES

14 Cable

Understanding the similarities & differences between the 3 cable types

16 21 Plug Patterns....and Counting

Our third in a series of articles covering the 21 worldwide plug patterns

20 IEC US SC23G Seeks Volunteers

Find out how you can become an active member!

22 Multifunction Power Entry Modules

The advantages & benefits when using multifunction PEM's

DEPARTMENTS

2 Employee Focus

Dan Ford –*Technical Support Specialist*

2 Putting the Pieces Together

Interpower Customer Testimonials

3 From the Editor-In-Chief

4 TECHPULSE

Lights, Camera, Action!

5 InfoPOWER Briefs

What's New on the InfoPower Blog

24 Interpower Corporation Trade Show Schedule

25 Rep Focus

Serving your electronic needs for 42 years

26 Interpower Corporation Sales Representatives

28 InterPOWER Pointz

The C5 cord

29 POWERSOURCE Play

Fun Facts & a MAZE to test your knowledge and skills!

ON THE COVER

The cover shows our variation of Strain Reliefs which act as cable anchors at the point of entry of a power cord. This issue contains information on how to utilize the reliefs when it comes to different power cords. To inquire about this product, contact Customer Service: info@interpower.com

EMPLOYEE FOCUS

Dan Ford



Dan Ford is our Technical Support Specialist, taking care of answering questions for all internal and external customers, regarding our products ratings and usage.

In addition to many other duties, Dan tracks new product requests entered into the database, assists with commercialization of parts including specifications, drawings, wiring instructions, and related parts. Dan is a member of our Product Task Force and helps analyze our product lines and potential new products. He is also a member of our Blue Ocean Team which searches for new products and markets we can develop. Dan keeps archives of our technical data.

Dan enjoys working with the wide variety of products that we carry and the number of different activities he gets to perform on a daily basis. He feels that this helps keep his job fresh and exciting.

One of Dan's favorite memories here at Interpower, was when he first started. At that time, he worked in our Manufacturing Department and was known for wearing flannel shirts. One day when he came in to work, the entire Manufacturing Department staff was wearing flannel too. Although, Dan admits

it took a little while for him to notice, it turned out to be a lot of fun.

Prior to joining Interpower Corporation, Dan received his Associates of Applied Sciences degree in Electronics/Telecommunications from Indian Hills Community College.

Putting the Pieces Together

By Hannah Pothoven

Interpower Corporation places a high value on teamwork. In order to delight our customers, and keep our short lead times and same day shipments, our employees must be able to connect with each other both inside and outside their departments, in order to meet our customer's needs.

Our Customer Service Department receives many orders which start as a quote request. One particular request came in on March 8th. The customer needed 70 pieces of a particular item. A quote was sent to the customer stating that Interpower currently had a 5-week lead time for the requested parts.

On March 9th, the customer replied with a Purchase Order requesting

30 pieces on their dock March 16th. We only had five pieces in stock, which we shipped that same day. The remaining 25 pieces needed to be ordered and assembled, making the ship date March 30th.

In an effort to get the order sooner, the customer and the local area sales representative worked with several Interpower Customer Service Representatives. The Customer Service Representative that placed the order brought the situation to the Purchasing Department who worked to expedite the parts.

Once the parts were received, they had to go to Interpower's Made-to-Order Manufacturing Department to be pieced together before shipping.

The parts were received at Interpower on March 11th and sent to the Manufacturing Department. The Made-to-Order Manufacturing Team worked diligently and was able to ship the order on March 13th in order to make it to the Customer's dock by March 14th...two days before March 16th as requested!

Due to excellent communication and teamwork between multiple departments within Interpower, and also with the local area sales representative, Interpower was able to avoid a stop in production for our customer.

POWER SOURCE

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Power systems components are not only regulated by safety agencies in industrialized countries but increasingly by other agencies with responsibility for the environmental impact of materials present in components and even the materials and chemicals used in manufacturing the components, regardless of whether they are present in the final product. Recently, the Dodd-Frank Act added regulations concerning four so-called conflict minerals that are mined in the Democratic Republic of the Congo and used in large quantities in the manufacture of electronic equipment. Collectively, these regulations create new and challenging issues for equipment manufacturers.

In an article on the RoHS Directive, we address recent changes to the Directive that add covered product groups and additional substances to the "prioritization list" for possible future control. This article also addresses the implications for equipment manufacturers.

Conflict minerals and the impact on equipment manufacturers is the focus of another article.

The second in the series of articles on designing for global markets addresses the use of an accessory power system to simplify power mains connections in equipment and systems consisting of two or more separately powered sub-systems. Our handy "Guide to International Cords" makes it easy to identify the proper cord for each market.

We present an article on the plugs used in Denmark, Argentina, Australia, and China. The last three plugs are so similar that they are difficult to distinguish from one another.

Our article on hospital-grade requirements defines and addresses the implications of hospital-grade plugs.

Finally, we offer an introduction to the BIS (Bureau of Indian Standards). The Indian market for electrical equipment is very large and is growing rapidly and knowledge of BIS will be increasingly important for equipment designers going forward.

We hope you find the information contained in these articles useful as you design and build electrical equipment that will be sold globally.

Best regards,

Bob Wersen, President

LIGHTS, CAMERA, ACTION!

By Kari DeBruin

In our effort to provide you, our customers, with the most current, up-to-date information you need to successfully design products for export, we have expanded our informational resources to now include instructional videos.

After much planning, designing, re-designing, trial and error, and sweat and tears (not to mention the number of paint jobs needed to get the green screen, the right green!), we are now ready to begin production in our new video studio. The studio, located in our Ames, Iowa facility will be the creative home to each of our new 3-4 minute video segments designed to give you the tools you need to design, produce, and compete in the worldwide marketplace. A great variety of topics will be covered and presented to you by our knowledgeable staff. Our first video will provide an overview of how to design products for worldwide markets, hosted by our Founder and President, Bob Wersen.

The videos will be available on our website at <http://www.interpower.com/> or on <http://www.youtube.com>, enter keywords Interpower Corporation.

We invite you to tap into our ever-expanding collection of informational resources and view our new videos! We also encourage you to submit ideas and topics that you would like to see covered to info@interpower.com or call (800) 662-2290.

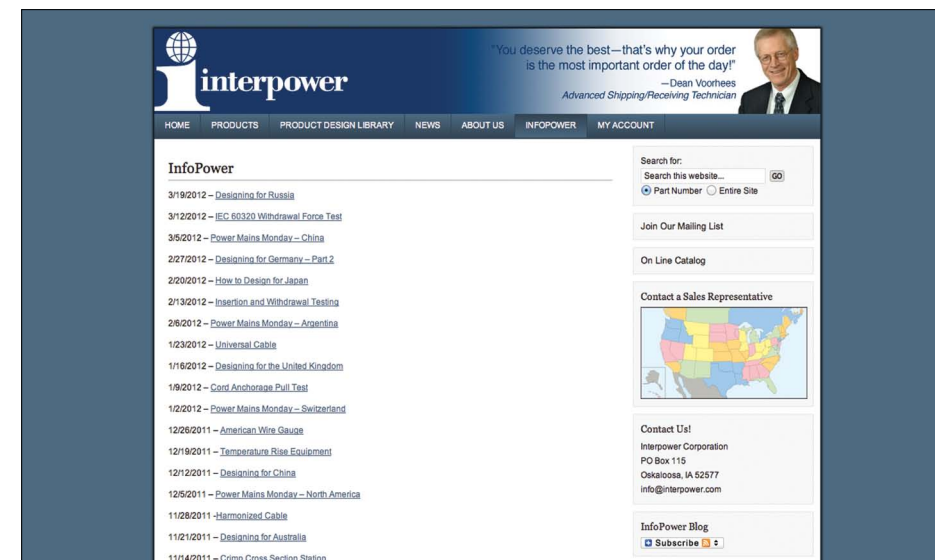
InfoPOWER Briefs

By Hannah Pothoven

Are you following Interpower Corporation's *InfoPower* blog? To date we have posted over 60 blog posts covering information you need to know when designing for worldwide markets.

We have also come to a close on *Power Mains Monday*, covering the 21 standard worldwide plug patterns. The last power mains we have covered are Argentina, China, and Brazil. Be sure to also view our blog posts on designing for countries worldwide to find resources for information you need when designing your equipment for export.

Interpower Corporation's *InfoPower* blog has also covered many other topics. If you have questions on North American or International cable, environmental regulations, or hospital-grade requirements, be sure



to check out our many blog posts on these topics and many more.

You can view our blog at www.interpower.com/ic/infopower-2. For topics not addressed in our blog, please email us at:

infopower@interpower.com. For urgent needs, please call our Customer Service Department at (800) 662-2290 or email info@interpower.com. Technical support is free and available from 7 a.m. to 7 p.m. Central Standard Time.



You can view our blog at www.interpower.com/ic/infopower-2. For topics not addressed in our blog, please email us at infopower@interpower.com. For urgent needs, please call our Customer Service Department at (800) 662-2290 or email info@interpower.com. Technical support is free and available from 7 a.m. to 7 p.m. Central Standard Time.

Letters to the Publisher

InterPower Source welcomes comments from our readers. Letters can be typewritten or e-mailed, and must include the author's full name, address, and telephone number. Address your submission to:

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The editors reserve the right to edit letters for clarity, style, and length. We regret that unpublished letters cannot be acknowledged or returned.

Strain Reliefs

By Kari DeBruin

Strain Reliefs, also known as cable glands, are a group of similar products that act as cable anchors at the point of entry of a power cord, through the chassis of a piece of equipment.

What are Strain Reliefs?

Strain Reliefs, also known as cable glands, are a group of similar products that act as cable anchors at the point of entry of a power cord or wires, through the chassis of a piece of equipment.

Why Do I Need a Strain Relief?

First of all, some strain reliefs provide a liquid-tight seal on the power cord entry into the equipment. This prevents moisture from entering the interior of the equipment and causing potential

damage to components and circuitry. Secondly, strain reliefs provide extra protection to power cords by protecting the cord from coming into contact with sharp edges on the chassis and over-bending. This protection helps extend cord life. Lastly, they reinforce the cord connection to your equipment. Many strain reliefs anchor the cord in a stationary position that prevents stress, such as twisting or pulling on the conductors, from reaching the wire connections inside the equipment, which could result in broken wires and the need for frequent cord replacement.

Where Does a Strain Relief Fit in?

The mounting threads of the strain relief can be threaded directly into the panel of the equipment or it can be eased through, a clearance located in the panel, and fitted with a locking nut. Strain reliefs can be attached almost anywhere on a piece of equipment, as long as there is sufficient clearance between the wall or other equipment. Lack of clearance might prevent the strain relief from doing its intended job and could result in damage to the cord and the strain relief.

Molded Strain Relief Testing

What Kind of Quality Testing is Done?

Most of the companion article is devoted to strain reliefs however, there are strain reliefs that are molded onto the cable and subject to additional testing.

The Abrupt Pull Test is a test that Underwriters Laboratories has established. UL 817 is the U.S. standard for cord sets and power supply cords. NEMA plugs used in these cords are required to pass a strain relief test in UL 817 section 99. UL requires the mechanical strength of the plug to be tested by repeatedly impacting the cord at the cord exit. This ensures that a pull force on the cord does not damage the internal plug terminations. During this test, the plug is mounted in a 45 degree steel plate. The plug blades and ground pin are anchored in the plate. A fixture with a rod, striker plate and a 1.1 kg (2.5 pound) weight are clamped to the cord. The weight is dropped 25 times. During and at the completion of this test, there is to be no loss of electrical continuity.

The Cord Flex Test verifies that the plug and connector relief designs protect cable and internal conductors from stress, breaking and arcing. IEC 60320-1 (appliance couplers) section 22 and IEC 60884-1 (plugs and sockets) section 23 require appliance couplers and plugs to be designed so that the cord cannot be subjected to excessive bending or pull-out at the cord exit. Testing is done to simulate the actual life cycle of the product. They also use it as a test to evaluate design features such as the durability and function of the cords strain relief. A poorly functioning strain relief may affect how well the wire crimp, bridge and terminal components respond to the test.

The testing agencies require that the connectors are subjected to a 20,000 flex test and plugs are subjected to a 10,000 flex test; both 45 degrees from cord axis, with 10N or 20N of force on the cord, and at a rate of one flex every second. During this test, the rated current of the plug or connector is passed through the phase conductors. Furthermore, half way through the test, the plug or connector is rotated 90 degrees. There shall be no interruption of current and no short circuit between conductors during this test.

How do I Choose a Strain Relief?

There are several things to think about when choosing a strain relief for your equipment. Listed below are six attributes of a strain relief to consider in order to choose the correct part.

The first thing to consider when choosing a strain relief is the material used. Two popular choices are nylon and nickel plated brass. Choosing a brass strain relief will be higher in cost, and may be better suited for high end equipment. Nylon strain reliefs, in most instances, have the same performance as brass, but with less cost. Other options available are PVDF (polyvinylidene fluoride), aluminum, and stainless steel.

Secondly, you should determine the style of strain relief you need for your application. Dome style strain reliefs are the most common and are designed to protect the wire entering the equipment. They help to secure the wire connection to the equipment and provide longer life to the cord by preventing it from rubbing against a rough or sharp edge where the cord passes through the equipment panel. Flex style strain reliefs offer flexible bend protection to the cord entering the equipment. They are designed to eliminate the possibility of the power cord kinking at the point where the cord enters the equipment.

Thirdly, along with the basic style, you should determine the body style needed. Strain reliefs can enter into the equipment with a straight body style, or a 90 degree

3/4, 1, 1 1/4, 1 1/2, and 2 inch.

The PG thread type is a German standard used throughout Europe and is sometimes referred to as

In the future, most all new equipment will use the metric measurement system which will therefore require the use of metric threads.

body style. Dome style strain reliefs also have options for multi-cable entry, flat cable, mini strain reliefs for the smallest cable sizes, and EMI to protect from electromagnetic interference.

The fourth thing to consider in determining the correct strain relief is the thread type and size. There are three main thread types that are used throughout the world. These thread types are National Pipe Thread (NPT), Panzer Gewinde (PG), and Metric.

The NPT thread type is the North American standard, and therefore is most commonly used for North American equipment. National Pipe Thread Tapered Thread is a U.S. standard for tapered threads used on fittings and threaded pipes. All NPT threads have a taper rate of 1/16 (3/4 inch per foot) which is measured by the difference in diameter (of the pipe thread) over its distance. The angle between the center axis and the taper of the pipe is 1° 47' 24" (1.7899°). The most common sizes are 1/4, 3/8, 1/2,

metric; however these threads are not truly metric as PG threads have a different angle and depth. The Stahlpanzerrohrgewinde (translates as steel conduit thread) standard for screw threads, most often

called by its shorter name Panzer Gewinde, is a German created technical standard. It is also used in Switzerland, Austria and some surrounding European countries.

The standard, codified by the DIN, which is the German Institute for Standardization, is DIN 40430. Panzer Gewinde sizes are named with the prefix PG with a number which correlates to the largest sized cable diameter that can be used. (Note: most manufacturers specify cable diameter 1 to 1.5mm less than this designator).



Due to the thin walls of the conduit, the thread depth cannot be large. Because of this, an 80° thread angle is utilized. The Verband der Elektrotechnik, Elektronik und Informationstechnik (VDE) originally standardized the thread for use with conduit and cable glands that were made of steel. Today, however, the thread can be used with both steel and nylon.

Metric thread type is the international standard and can be used worldwide. Some sources believe that the Metric thread will continue to replace all other types. In the future, most new equipment is expected to use the metric measurement system which will therefore require the use of metric threads. Any remaining threads will be reworked, or “metricated” – which simply means they will be reissued in metric dimensions as the older units become obsolete. Some refer to the older threads as “non-preferred.”

The fifth option to consider is your mounting hole. The mounting threads of the strain relief can be threaded directly into the panel of the equipment, or the strain relief can be eased through a clearance hole in the panel and fitted with a locking nut. Match the diameter of your mounting hole to the Major Diameter Inches to determine the size of strain relief you need.

Finally, in order to choose the correct strain relief, you should consider the cable you are using. You should know the diameter of your cable. When looking at

the correct style strain relief, find the ones that have the correct thread size or mounting hole size. Then look at the cable diameter specification range and choose the one that has the best fit. Ideally, the cable diameter should be towards the top end of the cable range for the strain relief chosen. If this is not possible, use the one with the best fit.

When Do I Use Conduit?

Typically conduit is used when the wire and cable require extra

protection from elements or physical damage. Conduit may also be used when users may need to add additional wires at a later time. 



Provide Bend Protection to Your Cords



Interpower Corporation strain reliefs provide protection to the wires and cable from stress and damage as they run through the panel of your equipment. Interpower Corporation carries metric strain reliefs, along with NPT and PG thread types. We offer a variety of styles including nylon or nickel-plated brass dome-nut, nylon flex-style, and 90 degree angled strain reliefs. RoHs strain reliefs are available as well. View our line of strain reliefs to choose the best product for your application.

Interpower Corporation offers no minimum order requirements from 1 to 1,000 pieces or more. Same day shipments are available for stock item orders placed by 6 p.m. CST.

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- No minimum order requirements
- Same day shipments available for stock item orders received by 6 p.m. CST
- Assembly services available upon request
- Free technical support



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rev. 4-12

Liquid Tight Strain Relief with Dome Nut

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 21mm Thread: 8mm	85820510	3.0–6.5mm	PG7/ 1/4"NPT	12.5mm
	85820610	2.0–5.0mm	PG7/ 1/4"NPT	12.5mm
	85820900	3.0–6.5mm	M12x1.5mm	12.0mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 22mm Thread: 8mm	85820520	4.10–8.0mm	PG9	15.2mm
	85820620	2.0–6.0mm	PG9	15.2mm
	85820910	4.0–8.0mm	M16x1.5mm	16.0mm
	85820420	4.0–8.0mm	3/8"NPT	17.2mm
	85820720	2.0–6.0mm	3/8"NPT	17.2mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 25mm, Thread: 8mm	85820530	5.0–10.0mm	PG11	18.5mm
	85820630	3.0–7.0mm	PG11	18.5mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 27mm Thread: 9, 13mm	85820920	6.0–12.0mm	M20x1.5mm	20.0mm
	85820540	6.0–12.0mm	PG13.5	20.3mm
	85820541	6.1–11.9mm	PG13.5	20.3mm
	85820640	5.0–9.0mm	PG13.5	20.3mm
	85820440	6.0–12.0mm	1/2"NPT	21.1mm
	85820740	5.0–9.0mm	1/2"NPT	21.1mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 28mm Thread: 13, 10mm	85820450	10.0–14.0mm	1/2"NPT	21.1mm
	85820750	7.0–12.0mm	1/2"NPT	21.1mm
	85820550	10.0–14.0mm	PG16	22.3mm
	85820650	7.0–12.0mm	PG16	22.3mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 31mm, Thread: 11, 14mm	85820560	13.0–18.0mm	PG21	28.4mm
	85820660	9.0–16.0mm	PG21	28.4mm
	85820460	13.0–18.0mm	3/4"NPT	26.7mm
	85820760	9.0–16.0mm	3/4"NPT	26.7mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 39mm Thread: 11, 16, 19mm	85820570	18.0–25.0mm	PG29	37.3mm
	85820670	13.0–20.0mm	PG29	37.3mm
	85820470	18.0–25.0mm	1"NPT	34.3mm
	85820771	13.0–20.1mm	1"NPT	34.3mm
	85820770	13.0–20.0mm	1"NPT	34.3mm
	85820870	18.0–25.0mm	1 1/4"NPT	41.9mm
	85820970	13.0–20.0mm	1 1/4"NPT	41.9mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 48mm, Thread: 13, 20mm	85820580	22.0–32.0mm	PG36	47.0mm
	85820680	20.0–26.0mm	PG36	47.0mm
	85820480	22.0–32.0mm	1 1/2"NPT	48.7mm
	85820780	22.0–26.0mm	1 1/2"NPT	48.7mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 49mm, Thread: 13, 14mm	85820590	32.0–38.0mm	PG42	54.1mm
	85820690	25.0–31.0mm	PG42	54.1mm
	85820600	37.0–44.0mm	PG48	59.4mm
	85820700	29.0–35.0mm	PG48	59.4mm

90° Strain Relief Snap Elbow with Dome Nut

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 45mm Height: 23mm Thread: 8, 15mm	85822420	4.0–8.0mm	3/8"NPT	17.2mm
	85822520	4.0–8.0mm	PG9	15.2mm
	85822620	2.0–6.0mm	PG9	15.2mm
	85822720	2.0–6.0mm	3/8"NPT	17.2mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 50mm Height: 27mm Thread: 8mm	85822530	5.0–10.0mm	PG11	18.5mm
	85822630	3.0–7.0mm	PG11	18.5mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 57mm Height: 30.5mm Thread: 9, 13mm	85822440	6.0–12.0mm	1/2"NPT	21.1mm
	85822540	6.0–12.0mm	PG13.5	20.3mm
	85822640	5.0–9.0mm	PG13.5	20.3mm
	85822740	5.0–9.0mm	1/2"NPT	21.1mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 59mm Height: 31mm Thread: 10, 13mm	85822450	10.0–14.0mm	1/2"NPT	21.1mm
	85822550	10.0–14.0mm	PG16	22.3mm
	85822650	7.0–12.0mm	PG16	22.3mm
	85822750	7.0–12.0mm	1/2"NPT	21.1mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 73mm Height: 40mm Thread: 11, 13mm	85822460	13.0–18.0mm	3/4"NPT	26.7mm
	85822560	13.0–18.0mm	PG21	28.4mm
	85822660	9.0–16.0mm	PG21	28.4mm
	85822760	9.0–16.0mm	3/4"NPT	26.7mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 91mm, Height: 51.5mm, Thread: 11, 13mm	85822570	18.0–25.0mm	PG29	37.3mm
	85822670	13.0–20.0mm	PG29	37.3mm

90° Liquid Tight Snap Elbow with Flex Nut

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 85mm Thread: 8, 15mm	85822020	4.0–8.0mm	3/8"NPT	17.2mm
	85822120	4.0–8.0mm	PG9	15.2mm
	85822220	2.0–6.0mm	PG9	15.2mm
	85822320	2.0–6.0mm	3/8"NPT	17.2mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 103mm Thread: 8mm	85822130	5.0–10.0mm	PG11	18.5mm
	85822230	3.0–7.0mm	PG11	18.5mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 119mm Thread: 9, 13mm	85822040	6.0–12.0mm	1/2"NPT	21.1mm
	85822140	6.0–12.0mm	PG13.5	20.3mm
	85822240	5.0–9.0mm	PG13.5	20.3mm
	85822340	5.0–9.0mm	1/2"NPT	21.1mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 130mm Thread: 10, 13mm	85822150	10.0–14.0mm	PG16	22.3mm
	85822250	7.0–12.0mm	PG16	22.3mm
	85822350	7.0–12.0mm	1/2"NPT	21.1mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 156mm, Thread: 11, 13mm	85822060	13.0–18.0mm	3/4"NPT	26.7mm
	85822160	13.0–18.0mm	PG21	28.4mm
	85822260	9.0–16.0mm	PG21	28.4mm
	85822360	9.0–16.0mm	3/4"NPT	26.7mm

Dome Style Nickel-Plated Brass Strain Relief

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 14mm Thread: 6mm	85824920	4.0–6.0mm	M10x1.5mm	10.0mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 19mm Thread: 5mm	85824930	3.0–6.5mm	M12x1.5mm	12.0mm
	85824110	3.0–6.5mm	PG7/ 1/4"NPT	12.5mm
	85824210	2.0–5.0mm	PG7/ 1/4"NPT	12.5mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 21mm Thread: 5, 6, 15mm	85824020	4.0–8.0mm	3/8"NPT	17.2mm
	85824120	4.0–8.0mm	PG9	15.2mm
	85824220	2.0–6.0mm	PG9	15.2mm
	85824950	4.0–8.0mm	M16x1.5mm	16.0mm
	85824320	2.0–6.0mm	3/8"NPT	17.2mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 22mm, Thread: 6mm	85824130	5.0–10.0mm	PG11	18.5mm
	85824230	3.0–7.0mm	PG11	18.5mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 23mm, Thread: 6.5mm	85824990	6.0–12.0mm	M20x1.5mm	20.0mm
	85824150	10.0–14.0mm	PG16	22.3mm
	85824250	7.0–12.0mm	PG16	22.3mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 24mm Thread: 6.5, 7, 13mm	85824040	6.0–12.0mm	1/2"NPT	21.1mm
	85824140	6.0–12.0mm	PG13.5	20.3mm
	85824160	13.0–18.0mm	PG21	28.4mm
	85824240	5.0–9.0mm	PG13.5	20.0mm
	85824260	9.0–16.0mm	PG21	28.4mm
	85824340	5.0–9.0mm	1/2"NPT	21.1mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 25mm, Thread: 13mm	85824060	13.0–18.0mm	3/4"NPT	26.7mm
	85824360	9.0–16.0mm	3/4"NPT	26.7mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 29mm, Thread: 8mm	85824170	18.0–25.0mm	PG29	37.3mm
	85824270	13.0–20.0mm	PG29	37.3mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 35mm, Thread: 8mm	85824180	22.0–32.0mm	PG36	47.0mm
	85824280	20.0–26.0mm	PG36	47.0mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 37mm, Thread: 9mm	85824190	32.0–38.0mm	PG42	54.1mm
	85824290	25.0–31.0mm	PG42	54.1mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 38mm, Thread: 10mm	85824200	37.0–44.0mm	PG48	59.4mm
	85824300	29.0–35.0mm	PG48	59.4mm

Mini Liquid Tight Strain Relief with Dome Nut

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 10mm Thread: 6mm	85824900	2.0–3.2mm	M6 x 1.5	6.0mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 13mm Thread: 6mm	85824910	3.0–5.0mm	M8 x 1.5	8.0mm

EMI Shielded Liquid Tight with Dome Nut

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 24mm Thread: 5mm	85824600	3.0–6.5mm	PG7/ 1/4"NPT	12.0mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 25mm Thread: 13mm	85824770	9.0–16.0mm	3/4"NPT	27.0mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 28mm Thread: 6mm	85824620	4.0–8.0mm	PG9	15.0mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 29mm Thread: 6, 15mm	85824660	5.0–10.0mm	PG11	18.0mm
	85824640	4.0–8.0	3/8"NPT	18.0mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 31mm Thread: 6.5mm	85824680	6.0–12.0mm	PG13.5	20.0mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
 Body: 32mm Thread: 6.5mm	85824720	10.0–14.0mm	PG16	22.0mm

	Part Number	Cable Diameter	Thread Type	Clearance Hole
	85824700	6.0–12.0mm	½"NPT	21.0mm
Body: 33mm, Thread: 13mm				



By Kari DeBruin

When designing products, you can choose from a variety of cable. In this article, we will focus on three types of cable: North American, International and Universal. In instances when power cords and cord sets are not readily available for your particular application, you may need to order the cable for your project. Some of these circumstances may be that the plug you need is not available in a molded configuration or the manufacturer wants to wait until shipping the product to install the plug onto the equipment. Regardless of the circumstance, it is important to understand the similarities and differences between the three cable types.

North American Cable

The AWG (American Wire Gauge) uses an inverse relationship to the size, so the larger the number, the smaller the cable.

Cable for single phase applications will either be a 2-wire or 3-wire variety. Cable with 2 wires is for Class II (ungrounded) applications, while 3-wire cable is for Class I applications, which require a ground. Three phase applications are going to require either

4 or 5 wires. Cables with 2 or 3 wires come in two distinct shapes: round or flat.

Round:

- have conductors that are insulated separately, inside an outer sheath
- Available with or without a jute/paper filler
- The inner conductors have either thermoplastic or rubber jackets, in

accordance with the outer jacket. For single-phase cable, the conductor color coding is typically: line (black or brown), neutral (white or light blue) and ground (green or green/yellow). Each conductor is sized in accordance with the AWG system.

- Flat:**
- constructed with conductors that are laid in a parallel fashion.
 - The outer jacket is typically PVC, thermoplastic, or rubber.

International/Harmonized Cable

International cable is similar in appearance to North American cable, but there are a number of important differences. International cable is sometimes referred to as “harmonized,” or simply “HAR.” Harmonized cable refers to cable which is manufactured and conforms to one of a unique set of standards developed in Europe. The term “Harmonized” refers to the fact that two or more standards have been merged together in an effort to promote commonality in the construction of the product. Cable manufactured outside Europe cannot exhibit the “HAR” marking. This measurement comes from the cross section diameter of each conductor, expressed as mm². Because the standards and methods of measuring are different, harmonized cable sizes do not correspond with North American sizes.

- Does not have filler.
- Does not have as high a tensile strength as a similar North American cable.
- The inner conductors are made of material consistent with the outer jacket. All harmonized cable will be color-coded line (brown), neutral (light blue) and ground (yellow/green striped). These conductors are sized

with the mm² measurement.

- A series of numbers and letters indicate the jacket material, ratings, and size of the cable.

Universal Cable

Universal PVC cable combines harmonized H05VVF with metric sized conductors and SJT with AWG (American Wire Gauge) sized into one cable.

The table below (Figure 1) provides basic information about the cable

While it is possible to design products using Universal cable, it is not recommend for use in country specific applications. Instead, it is recommended only for accessory power distribution, such as jumper cord sets or internal wiring harnesses.

Need more information?

For more in-depth information on cable types, please visit our website at: <http://www.interpower.com/ic/designers/in-depth-product-line-information/p60info/>

We also have blogs available for quick reference.

For more information on American Wire Gauge, visit our blog: <http://www.interpower.com/ic/news/infopower/american-wire-gauge/>

For more information on harmonized cable, please see our blog at: <http://www.interpower.com/ic/news/infopower/harmonized-cable/>

For more information on universal cable, please visit our blog at <http://www.interpower.com/ic/news/infopower/when-should-you-use-universal-cable/>.

Figure 1

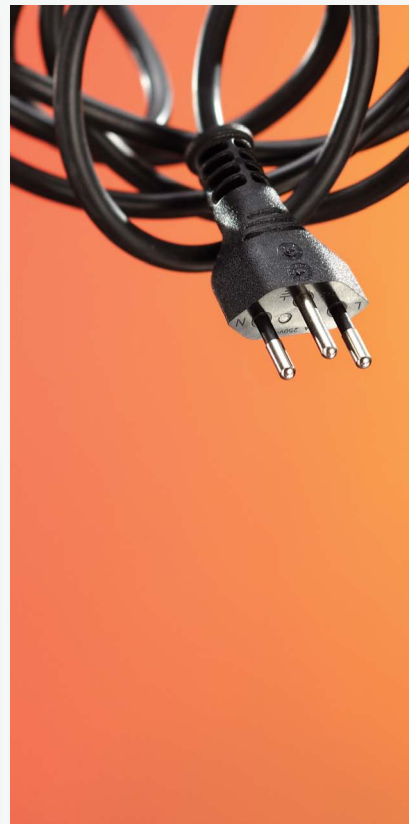
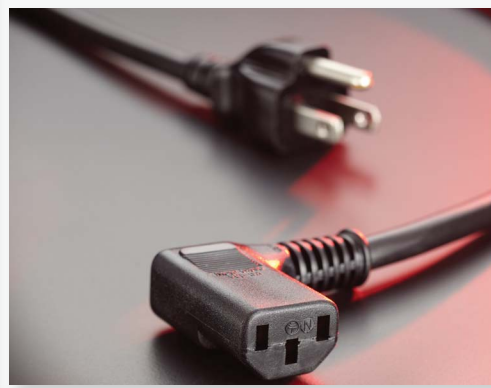
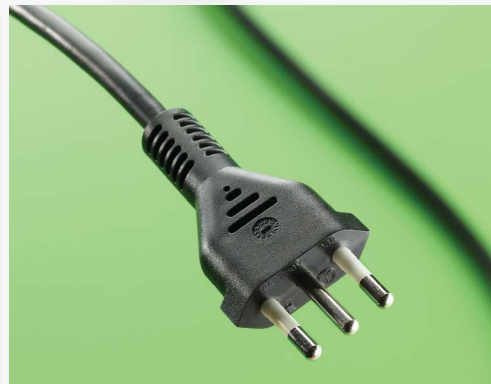
The first line in this table is the international ratings, the second North American

Part Number	Conductor Size	Current/Voltage Rating	Temp. Rating	Cable Type	Outer Diameter (mm)
86020600	1.00 mm ² 18 AWG	10A/300/500VAC 10A/300/VAC	-40°C to 70°C 60°C	H05VV-F SJT	7.6 mm 7.6 mm
86020610	1.50 mm ² 16 AWG	16A/300/500VAC 13A/300/VAC	-40°C to 70°C 60°C	H05VV-F SJT	8.3 mm 8.3 mm
86020620	2.50 mm ² 14 AWG	25A/300/500VAC 18A/300/VAC	-40°C to 70°C 60°C	H05VV-F SJT	10.0 mm 10.0 mm
86020630	4.00 mm ² 12 AWG	32A/300/500VAC 25A/300/VAC	-40°C to 70°C 60°C	H05VV-F SJT	11.5 mm 11.5 mm

21 Plug Standards... and Counting

Our third in a series of articles covering the 21 standard worldwide plug patterns

By Kari DeBruin



In this edition of InterPower Source, we are continuing our series of articles devoted to describing the 21 standard plug patterns that are currently used throughout the world. In our last edition, we covered the plugs from Denmark, Argentina, Australia and China. In this article, we will be focusing on the plugs used in Brazil, Italy, Japan and Switzerland.

We will begin by taking a look at the plug from Brazil.



The Brazilian NBR 14136 is the new standard for Brazilian plugs and receptacles, which went into effect on all new equipment sold in Brazil as of January 1, 2010. This standard is based on the international IEC 60906-1 standard, developed to encourage countries to adopt one plug and receptacle for global use. Before this Brazil used a "universal" receptacle that accepted both the North American and Europlug plugs.

The new plug is very similar in looks to the Swiss plug, but they are not

interchangeable. The Brazilian plug is wider, the plug face is slightly larger and the pins on the Brazilian plug are closer together.

- Class I plugs are rated at 10 and 20 amps
- The new standard does not include a medical grade plug
- Brazil uses 110-220 Volts and 60 Hertz

Now, let's discuss the plug from Switzerland.



The Swiss plug is governed by SEV 1011:1999. However there has been a change to the standard which will be enforced December 31, 2012. The new standard, SEV 1011:2009 requires the line and neutral pins to be partially insulated. This change only affects the 10 amp plug.

The Swiss plug is very similar to the Europlug and Italian plug however; the Swiss plug has a grounding pin that is slightly higher than the line and neutral pin. The 10 amp plug has round pins while the 16 amp plug

has slightly square pins, so that you cannot accidentally plug a 16 amp plug into a 10 amp socket.

- Like most of Europe, Switzerland does not have a medical plug requirement in its standard
- Class I plugs are rated at 10 and 16 amp. Switzerland uses the Europlug for class II applications at a 2.5 amp rating
- The Swiss plug is rated up to 250 Volts and 50 Hertz.
- The plug is pin and electrically polarized

Next, we'll cover Italy.



There are several types of plugs used in Italy (including the Continental European CEE 7/16 plug). The official standard for the Italian plug is CEI 23-50 and is relatively standardized in Libya, Ethiopia and Chile. It is also used in parts of Northern Africa.

The Italian plug pattern is 3 pins in a row with the middle pin being ground. The Class I plugs are rated at 10 and 16 amp. The 16 amp pins are

larger than the 10 amp pins so that you cannot accidentally plug a 16 amp plug in a 10 amp socket. Like many European countries Italy uses the Europlug for Class II applications.

- Italy does not have a medical grade plug in its standard
- The Italian plug is rated up to 250 Volts and 50 Hertz.
- The plug is not pin polarized

Lastly, let's look at Japan.



The Japanese plug and socket, on first glance, is identical to the North American NEMA 5-15 standard. However, the Japanese system, which is specified in JIS 8303, incorporates tighter dimensional requirements,

different marking requirements and mandatory testing and approval by a Japanese testing agency. The cords have a maximum output rating of 15A/125VAC. The cable must meet JIS C3306. Japanese wire sizes and current ratings are different than those used elsewhere in the world.

Japanese mains frequently do not provide for grounding; grounding is made to the wall socket by use of an adapter. As a result, Class I grounded sockets are used less frequently in Japan than in the U.S. Most appliances sold in Japan use a Class II, ungrounded plug. Class I grounded appliances should be sold with an external ground wire, such as Interpower part 86589030 or a grounding adapter, such as Interpower part 88100011.

DENAN is a mandatory national law administered by Japan's Ministry of Economy, Trade and Industry. Cords, plugs and sockets must carry the PSE approval mark.

Japan has a medical grade standard

JIS T1021, but the hospitals make the final decision on whether or not they want to use a medical grade plug.

- Japanese wire sizes and current ratings are different than those used elsewhere in the world. Japan is at 100 volts and 50 and 60 hertz. It would be advisable to check the frequency before shipping your equipment to Japan. 

For more information on plug patterns, please see our whitepaper, "National Power Mains." A link is available on our home page at www.interpower.com. More detailed information on standards and where to purchase standards can be found on our InfoPower blog tab. You can also download our "Guide to Worldwide plugs and sockets Patterns & Power Mains" simply by clicking on our "Product Design Library" tab. For your convenience we have also included a copy of the guide in this edition of InterPower Source. Be sure to check out our next article on plug patterns in the next edition of InterPower Source. We will be discussing North American plugs.

Connect to the World with IEC 60320 Sheet I Cords



Interpower Corporation manufactures a wide range of power cords and cord sets with a molded IEC 60320 Sheet I plug. The Interpower molded IEC 60320 Sheet I power cords and cords sets are rated up to 250 VAC and 16 A for international applications, and up to 250 VAC and 20 A for North American Applications. The Interpower line of IEC 60320 Sheet I power cords and cord sets carry all the necessary approvals and same day shipments on stock cords is available.

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US IEC SC23G TAG Seeks Volunteers

NEMA is seeking participants for IEC 60320 and IEC 60799 standards group

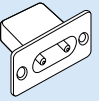
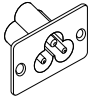
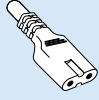
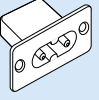
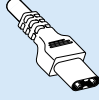
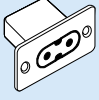
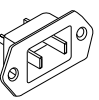
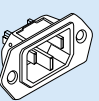
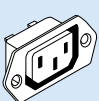
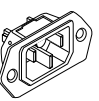
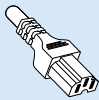
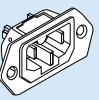
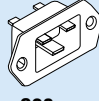
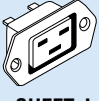
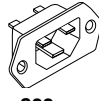
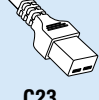
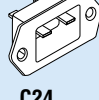
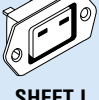
By Kari DeBruin

The International Electrotechnical Commission (IEC) is a non-governmental, not-for-profit organization which is comprised of individuals from around the world. This panel of experts each represents their own country’s interest in a variety of electro-technical venues.

“Electrotechnology” is the term used to describe the millions of devices that contain electronics, and use or produce electricity. The manufacturers, importers and exporters of electrotechnology rely on IEC members to produce International Standards and Conformity Assessment Systems that they need and require. The standards that the IEC produces are consensus based and represent the needs of the participating nations. Each country has a voice and one vote. Because of the magnitude of items and issues the IEC addresses,

the group is broken down into approximately 174 Technical Committees (TC) and Sub-Committees (SC), and an array of project and maintenance teams that perform standards work. These committees are comprised of almost 10,000 experts from around the world in various specialties such as academics, commerce, government, test and research labs and consumer groups. Currently, the US Sub Committee 23G, the committee which focuses on Appliance Couplers is in need of volunteers. According to the IEC, SC23G is responsible for the international standards of the IEC 60320 Series as well as for IEC 60799. The scope of this group is “to prepare standard sheets, tests and requirements for safety and interchangeability of the couplers, which allow for detachable connections between flexible cords and electrical appliances or equipment, and between parts

of multi-part appliances. The appliances or equipment may have a detachable input connection and also detachable output connections to other appliances or equipment. The couplers are not intended for use in fixed installations.” An IEC 60320 chart is available on our website at: <http://www.interpower.com/ic/iec60320> chart. This chart has also been included. By being an active member of this group, you will be able to participate in developing global standards on cord terminations and inlets/outlets for equipment. In the past, members of this group have been IEC 60320 components manufacturers, however, since much of that work has shifted to China, today the group is comprised mostly of importers of cords and IEC 60320 devices. i

IEC 60320-1 Appliance Couplers Connectors			IEC 60320-2-2 Interconnection Couplers Plug Connectors		
Inlets			Outlets		
 C1	Class II Cold	 C2	0.2A Family These couplers are not in the IEC 60320 standard.		
 C5	Class I Cold	 C6	2.5A Family		
 C7	Class II Cold	 C8	 SHEET A	Class I	 SHEET B
			 SHEET C	Class II	 SHEET D
 C9	Class II Cold	 C10	6A Family These couplers are not in the IEC 60320 standard.		
 C13	Class I Cold	 C14	 SHEET E	Class I	 SHEET F
 C15	Class I Hot	 C16	10A International/ 15A North American Family		
 C15A	Class I Very Hot	 C16A	These couplers are not in the IEC 60320 standard.		
 C17	Class II Cold	 C18	 SHEET G	Class II	 SHEET H
 C19	Class I Cold	 C20	 SHEET I	Class I	 SHEET J
 C21	Class I Very Hot	 C22	16A International/ 20A North American Family		
 C23	Class II Cold	 C24	 SHEET K	Class II	 SHEET L

These couplers are for ac only, with a rated voltage not exceeding 250VAC and not exceeding the rated currents listed above for 50Hz or 60Hz power.

If you are interested in applying for group participation, please contact: Andrei Moldoveanu • IEC SC23G TAG Secretary • NEMA • 703-841-3290 • EMAIL @ moldoveanu@NEMA.org

If you have questions regarding the SC23G, please contact: Rob Taylor • Vice President of New Product Development & Quality Assurance • Interpower Corporation • 641-672-8448 • EMAIL @ rtaylor@interpower.com

Source: IEC. Web. 21 Jan. 2012. <<http://www.iec.ch/about/>>.



MULTIFUNCTION POWER ENTRY MODULES

By Kari DeBruin

A power entry module is an electromechanical component used in order to integrate the inlet with other components, such as a circuit breaker, voltage selector, an electromagnetic interference line filter, and appliance fuse holders and outlets. A multifunction power entry module is a group of common front or back panel components that are placed together and conveniently packaged in a single unit. Most power entry and multifunction modules connect to the AC power-line, and are therefore required to meet safety standards set by Underwriters Laboratories (UL), the Canadian Standards Association (CSA), Verband der Elektrotechnik, Elektronik und Informationstechnik (VDE), in addition to the BSI Group (BSI) safety standards agency.

There are several advantages and benefits when using multifunction power entry modules. These include increased savings of time and expense, better utilization of space, improved appearance and a safer consumer product.

Savings of Time and Expense:

Although the multifunction power entry module itself costs more than an individual component, by incorporating a number of single components into one item, savings are achieved in many other areas. Probably the largest area of savings is in assembly labor. Now, instead of mounting different parts or running wiring harnesses from one component to the next, the assembler can quickly fit one

part into the panel, with minimal tooling and far less internal wiring. Many modules utilize quick disconnect (QD) terminals—allowing the wires to be quickly and easily connected to the modules. In addition to labor savings, warehouse storage space, documentation and time spent on testing and engineering is greatly reduced.

Better Utilization of Space:

By combining multiple components into a single compact unit, there is less wasted space behind the panel which gives the options of downsizing the panel area, increasing or enhancing functionality for other devices on the panel, or decreasing the entire size of the equipment.

Improved Appearance:

Multifunction modules offer a sleeker more modern look.

A Safer Consumer Product:

In most multifunction power entry modules, the power connector must be removed from the inlet prior to changing the fuses or switching the voltage selector. This feature drastically reduces the risk of electrical shock.

So, how do you choose a power entry module for your application?

Typically, there are five functions that can be incorporated into a power entry module. They include a power inlet, switch, fuse holder, voltage selector, and filter.

Power Inlet: Most power entry modules use an IEC 60320 C14 inlet, and are typically rated for applications up to 10A for international and 15A North American use. There are other power entry modules on the market for the lower rated 2.5A C6 and C8 inlets, as well as a few power entry modules utilizing the 16/20A C20 inlet. Because the C6, C8,

and C20 multifunction modules are not as common or popular, it will likely be more difficult or impossible to find some option combinations.

Switch: If specialized switch requirements are not an issue, it may be desirable to specify an ON/OFF rocker switch as part of the multifunction power entry module. Module specifications should be examined to determine whether switches are SPST (Single Pole, Single Throw) or DPST (Double Pole, Single Throw) and whether or not they are lighted.

Fuse Holder: If your application requires circuit protection, fuses are most commonly used. Some modules accept a 5x20mm fuse and a 1/4 x 1 1/4" fuse; other modules accept only one or the other. Note: both international and North American fuses are available in the 5x20mm size, whereas the 1/4 x 1 1/4" size is only available for North American use. You will also need to determine whether you need a power entry module with a single fuse or double fuse holder.

Voltage Selector: Most equipment today uses a universal switching power supply and does not require a voltage selector. Voltage selection is only needed for equipment that runs on a dedicated voltage (e.g. equipment will only run on 120V). Typically, voltage selectors are available in 115V/230V or 120V/240V.

Filter: There are two types of filters, a standard EMI/RFI filter and a medical-grade EMI/RFI filter. Filters may be shielded or unshielded determining how much noise radiates out of or into the equipment. Testing is the only way to ensure the correct filtered power entry module is specified. 

If you are interested in learning more about power entry modules, you can view Interpower Corporation's webcast at <http://www.interpower.com/ic/pemoduleswebcast/>

Upcoming Trade Shows



Each year Interpower Corporation attends shows throughout the United States and Europe. Not only does it give us the opportunity to display and highlight our products, but it also gives us a chance to visit with you. Stop by and see us at one of the following shows.

- | | |
|-------------------|---|
| May 22-24 | MD&M East
at the Pennsylvania Convention Center in Philadelphia, PA; Booth # 1454 |
| May 24 | ES Live
at the Medejski Stadium & Conference Centre in Reading, UK; Booth #E16 |
| June 2-4 | AAMI
at the Charlotte Convention Center in Charlotte, NC; Booth # 421 |
| June 19-21 | MD&M Chicago
at Mc Cormick Place in Chicago, IL; Booth # 2235 |

Rocky Mountain Territory

Serving your electronic needs for 42 years

By Judy Nunnikhoven



Interpower Corporation has 19 Independent Manufacturers Sales Representative firms across the United States and Canada. Interpower's sales representatives are knowledgeable about our products and able to help our customers with design applications, placing and expediting orders, and any other support our customers may need. A complete list of all our Manufactures Sales Representatives can be found on pages 26 and 27.

Roger Long and Paul Peek incorporated Omega Ltd. in 1970, and Interpower Corporation was one of their first principals. Omega's primary markets are: instrumentation, data storage, medical, industrial and military. Their product lines include front and rear panels, interconnect products, power supplies, circuit

protection, switches and visual communications. In fact, they like to say they can do everything on your front and back panels, including the panels and the interconnect products.

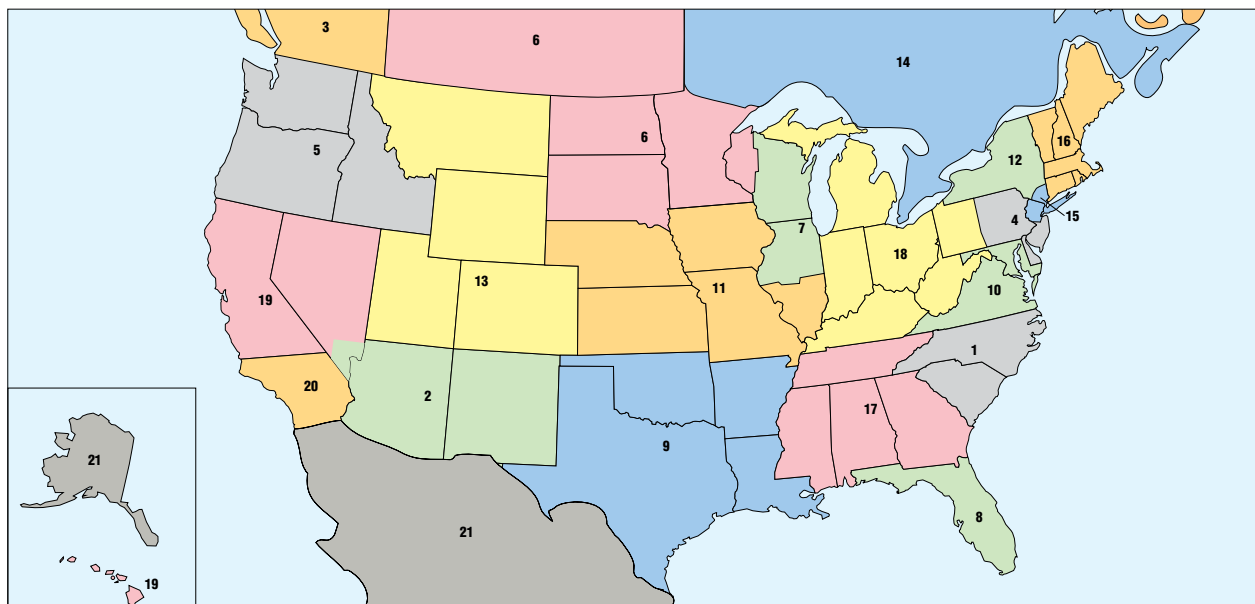
Omega Ltd. has been in business for 42 years. Their mission is to be a service conduit to bring the best technology to their customers so they can succeed. Through the success of their customers their principals will succeed. Omega Ltd. strives to develop the best relationships so that they can add value to all who are involved with Omega Ltd.

Roger Long, co-owner of Omega Ltd. recalls a time when a customer was in a tight spot. Their customer realized two days before Christmas that they had an end of year

shipment of \$3M ready to ship but they had not ordered the appropriate cord sets. The customer called Omega Ltd. and asked if there was any way they could get their cords the next day. Even though Christmas was two days away, Interpower and Omega were able to ship the customer's cords out on an overnight delivery and the customer was able to ship their product on time!

Omega Ltd. covers the Rocky Mountain area including the states of Colorado, Wyoming, Utah and Montana. Omega Ltd has five employees that are ready and willing to work with you on your design and product needs. Their main office is located in Littleton, CO and they can be reached by phone at **303.762.1921** or by email at **sales@omegaltd.com**.

Looking for an Interpower Corporation Sales Representative?



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InterPOWER Pointz



C5 cords

By Kari DeBruin

The Mickey Mouse Connector, *otherwise known as the IEC 60320 C5 connector*, was originally intended for use on sewing machines, but is now used on laptop computers. The unique “mickey mouse shape” clearly identifies the C5 connector, which plugs into a transformer. This connector is also referred to as a cloverleaf plug, and is rated up to 7A in North America and 2.5A Internationally. The C5 Connector is ideal in situations when you might not need as much current in your product design. In the US, the C5 can be used with SJT and SPT-2 18 gauge cable. For international use, it can be used with H03VVF.75mm² and H05VVF.75mm².

For medical applications, the C5 can be used on H05VVF.75mm², and SJT 18 gauge. It can also be used in any other medical application with the exception of Denmark.

POWERSOURCE Play

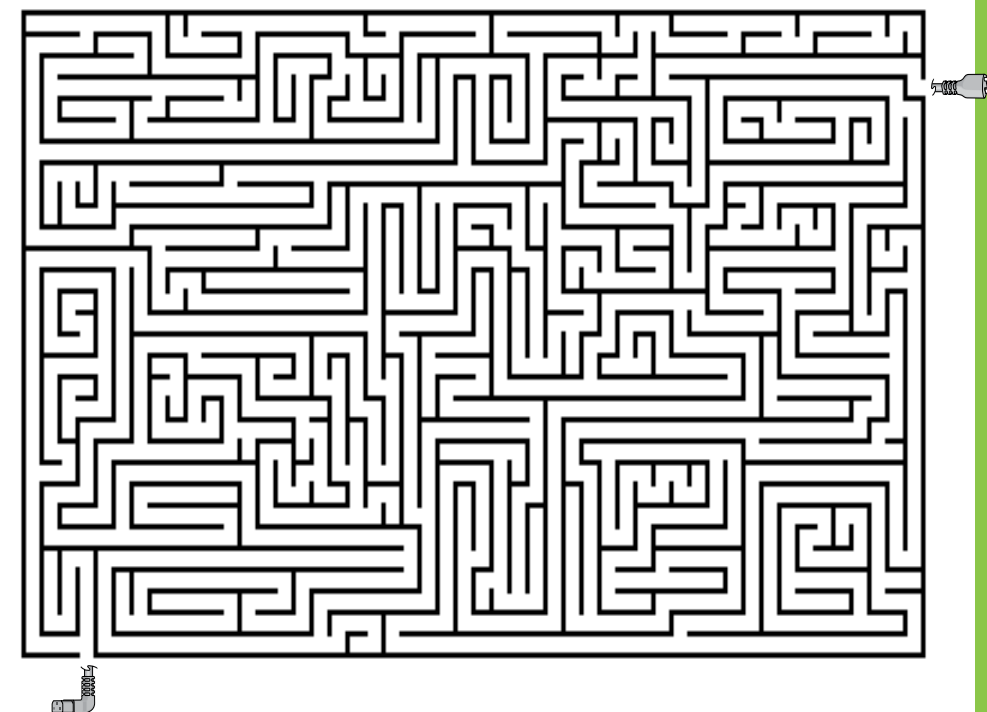
fun FACTS

1. When was PVC invented and by whom?
2. When was PVC first used for wire insulation?
3. What are the 5 best conductive metals in order?
4. What was the Great Chicago Fire?
5. When was the first edition of the IEC 60320 standard published?

You can find the answers to the fun facts at the bottom of this page.

MAZE

For answers to the maze this month, please go to www.interpower.com/ic/answers



1. Polyvinyl Chloride (PVC) was accidentally discovered on at least two occasions in the 19th century. The first, in 1838, by a French physicist and chemist Henri Victor Regnault and the second in 1872 by the German Eugen Baumann. The material was difficult to work with and no one mastered the challenge of commercial applications. In 1913, German inventor Friedrich Heinrich August Klotz took out a patent on PVC, which he polymerized with sunlight. (Wikipedia and pvc.org). 2. During the Second World War (1939 to 1945), PVC quickly replaced traditional material to insulate wiring on military ships. In the 1950s, advancements in processing to make PVC more durable led to applications in the building trades. (pvc.org). 3. 1) Pure Silver, 2) Pure Copper, 3) Pure Gold, 4) Aluminum, and 5) Zinc (New World Encyclopedia, Wikipedia, and Metal Detecting World). 4. The Great Chicago Fire was a massive blaze that burned from Sunday, October 8, to early Tuesday, October 10, 1871. The fire destroyed approximately 3.3 square miles of Chicago, Illinois and helped result in massive reform of fire standards and fire prevention. (Wikipedia). 5. This standard was first published in 1970 as the IEC 320 standard. It was later renamed after the IEC changed their numbering system: it became IEC 60320.



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