The Product Safety Engineering Newsletter

IEEE PSES Product Safety Engineering Society

Vol. 9, No. 3 September 2013

What's Inside

President's Message

Looking Back at Austin in October 2013

"Time flies. It's up to you to be the navigator." (Robert Orben)

By the time some of you read these lines, our International Symposium on Product Compliance Engineering (ISPCE 2013) in Austin, TX, will be history. As usual, this symposium will have provided an opportunity for us all to meet old friends, and make new ones. The symposium will have also continued to provide us all with education, information exchange, networking and just plain social and entertainment opportunities.

But, I think that it would also be fair to assume that we **will not have met MOST of you**, my fellow PSES members, in Austin. Indeed, our symposia are well attended, the technical program is rich and to the liking of the attendees, the atmosphere is great and friendly; what else would you expect from Austin, also known as "Live Music Capital

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President-Elect's Message

Hello PSES Members!

My name is Kevin Ravo and I will be the PSES President for the 2014–2015 Term. Before I get started, I wanted to take a moment to introduce myself and begin what hopefully will be an on-going dialogue (two way conversation) with all of you.

I've been in the product safety business for 35+ years. I have also been with the same company, UL, for that time. Even though it sounds like I've been doing the same thing at the same place for a long time, that is really not the way it has been. I have actually had the opportunity to work in a number of industries or product areas while at UL, from power and controls, to tools, to audio video, information technology and telecommunication products, to name a few. I have been involved with various aspects of product safety as well, from the basic lab testing (they don't let me do anything in the lab any more) to product evaluation and cer-

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The
Product Safety Engineering Newsletter

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IEEE PSES Web Sites

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11th Annual IEEE Symposium on Product Compliance Engineering – *Back to the Future!*

Save the Date – Note New Time of Year!!! **May 5 – 7, 2014**

Watch for Call for Papers – Q4 2013!

Location – Where it all Started – San Jose/Santa Clara Valley…..

Double Tree by Hilton Hotel San Jose
2050 Gateway Place, San Jose, California, 95110, USA
TEL: 1-408-453-4000 FAX: 1-408-437-2898

Chapter Safety Probes

To see current chapter information and people looking to start chapters, please go to the chapter page at:
http://www.ieee-pses.org/Chapters/index.html

Chicago Chapter

We have had quite a busy and exciting year. UL has committed to allowing us their facility for 2013. UL, Chamberlain Group and Product Safety Consulting have been our sponsors so far this year. We've been using webx for each meeting and it seems to be catching on. Members who cannot attend in person, can now attend from their offices or homes. Members seem to like the option and attendance continues to increase.

- March, 2013 meeting - Doug Nix presented on What's happening with the Machinery Directive. Doug Presented via webx from Toronto while the group was at UL's facility in Northbrook, IL
- June, 2013 - Executive committee meeting. Mike Sullivan became Treasurer.
- July, 2013 - Dr. Bala Pinnangudi from Exponents presented on Accessible Hot Surfaces and Burn Hazards. This was also done via webx with Bala in CA and several attendees scattered throughout the USA. This was also a joint meeting with the PSES's Risk Assessment Technical Committee.
- September, 2013 - Steve Brody from EHS Consulting presented on RoHS 2. Again, via webx as Steve was in Boston. This was also a joint meeting with the PSES Boston Chapter.
- We are also planning a Holiday meeting before the end of the year. Details to follow.

John Allen
Jrallen@productsafetyinc.com

TAC News

Hello all Industrial Equipment and Controls TC Group Members! Mike Nicholls would like to set up a meeting with all Industrial and Controls Technical Committee members attending the PSES Symposium this year in Austin Texas October 7-9.

You can respond back to Mike at mnicholls@a-m-c.com.

News and Notes

Seeking Volunteers

PSES is currently seeking volunteers to help out with the following positions/activities:

- Layout of the newsletter - experience with Adobe InDesign and Illustrator beneficial. We could also use some artistic talent as we work on upgrading the newsletter to look more like a magazine, so if you have an inner graphic artist looking to break out, contact us!

- Web designer - experience with Adobe DreamWeaver or other web tools desirable. Help us do a complete makeover of the PSES website.

Please contact Dan Roman at dan.roman@ieee.org if you are interested.

PSES Jobs Web Page

PSES has a web page for employers and job seeks at http://www.ieee-pses.org/jobs.html. Employers may post jobs seeking regulatory or compliance-related personnel free of charge. Job postings will remain on this web site for a period of 6 months but may be removed earlier (or extended longer) by request of the employer.

See http://www.ieee-pses.org/jobs.html for posting policy and how to submit requests or contact Dan Roman at dan.roman@ieee.org for more information.

Power Supply Cords

Regulatory, Certification, Marking and RoHS Compliance Requirements for Power Supply Cords

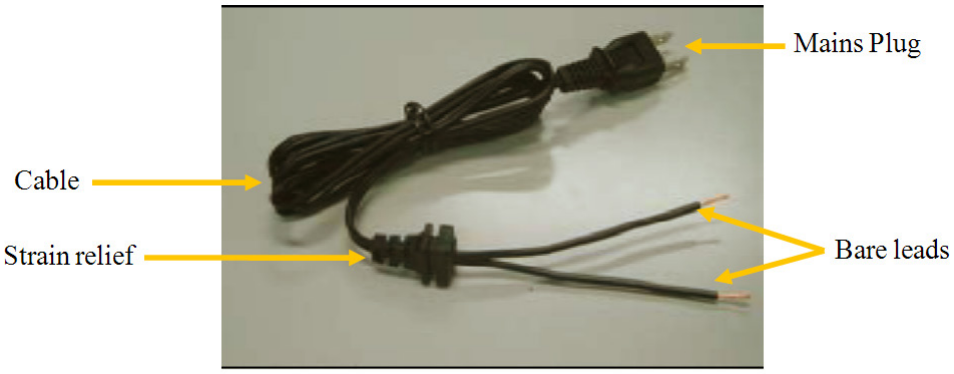
by Lal Bahra

A power supply cord is required to connect equipment to a mains socket outlet to provide power to electrical appliances. The power supply cord consists of a mains plug, cable, and either a connector for plugging into the input connector of the appliance or bare leads for connection to the appliance terminals for the power supply cord conductors. Power supply cords are available as two types:

- Non-detachable type, also called hard-wired type, is provided with a strain relief device where it enters the appliance enclosure.
- Detachable type, also known as a power cord set.

Non-detachable power supply cord

The power supply cord may be a non-detachable type, although this type is becoming less common. The non-detachable power supply cord has two essential elements, namely a plug and a cable. The equipment using this type power cord is designed to have a strain relief device. The strain relief does not allow strain on the cord to go through to connection points of the power supply cord conductors. Most countries have requirements for their approval. The certification agency in the country will require appropriate markings on the power supply cords and/or the smallest box containing them.



Power supply cord

Detachable power supply cord

A detachable power supply cord is usually known as a power cord set. This is the most widely used type of power cord. This assembly has three essential elements, namely a plug, a cable, and a connector. Most countries have requirements for their approval. The certification agency in the country will require appropriate markings on the power cord sets and/or the smallest box containing them.

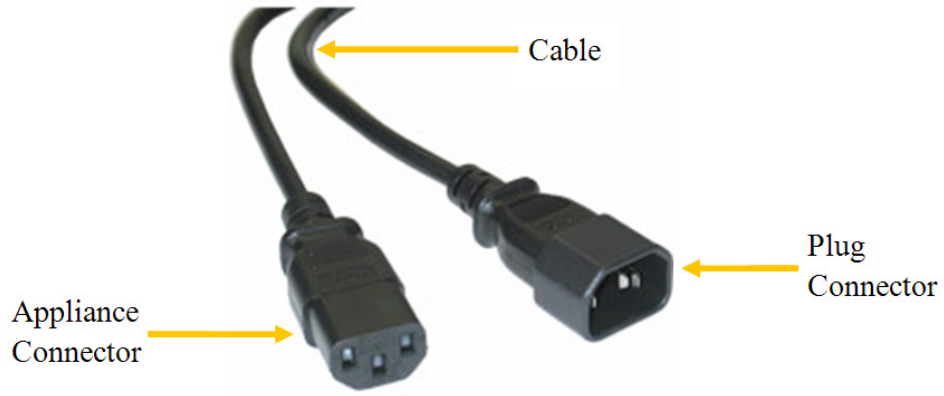
Power cord set

Standards for power supply cords and cord sets

- In the U.S., UL 817 for cord sets; UL 62 for cordage;
- In Canada, CSA C22.2 No. 21 for cord sets; CSA C22.2 No. 49 for cordage;
- In EU member countries, EN 60799 for cord sets; EN 60884 for plugs; HD-21, HD-22, EN 60227, or 60245 series;
- In other countries, IEC 60799 for cord sets; IEC 60884 for plugs; IEC 60227 or 60245 series or National Standards for cordage;
- In most countries, IEC 60320 series for connectors and appliance couplers is acceptable.

Jumper power cord:

A jumper power supply cord is required to connect an accessory or other equipment to provide mains power from an appliance outlet connector on the equipment or a power distribution unit (PDU). Some countries require their approvals. The test agency in the country will require appropriate markings on the jumper cord or its elements and/or the smallest box containing them.



Jumper power cord

Classification of power cords

Power supply cords and power cord sets are classified into two main classifications, as follows.

Class I power cord—This power supply cord or power cord set is intended for appliances with earth leakage current protection (i.e., plug having an earth pin, cordage having an earthing conductor, and appliance connector having an earth pin). The leakage current is conducted to the building earth via the earthing conductor. This construction is commonly known as class I construction

***Class II power cord*—**This power supply cord or power cord set is intended for appliances with reinforced insulation or double insulation construction commonly known as class II construction. Due to high impedance of the insulation, the leakage current is usually very small. If the plug is class II, then the connector must be class II.

Class II power cord

Length of the power supply cord and power cord set

For a power supply cord, the length is measured from face of the connector or plug, not including pins, to the end of the cable, stripped or not

For a power cord set, the length is measured from the face of the connector to the face of the plug, not including pins

For ac adapters, UL accepts power cord length of 1 m (being changed to 0.5 m) instead of required length of at least 1.5 m if the total length of ac mains cord and the output cord exceeds 1.5 m.

Power supply cords in the same box as the equipment

The following countries do not allow any other cord to be in the box for the equipment except their own: Argentina, Indonesia, Philippines, Trinidad & Tobago, Venezuela and Vietnam

Jumper cord approvals
The following countries require approval for jumper cords:
Argentina, Australia, China, EU member countries, Japan, Korea (South), Russia, South Africa and U.S./Canada

Halogen-free power cords
Halogen-free means absence of polyvinyl chloride (PVC) and Brominated/chlorinated flame retardants (TBBP-A, PBDEs, etc.). Halogen-free means < 1000 ppm, < 1000 mg/kg, < 0.1% by weight of Bromine or Chlorine if the source is the flame retardant. Halogen materials like Fluorine, Iodine and Astatine are not restricted. Cable insulating materials contain resins for insulation, for example plasticizers, stabilizers, flame retardants, fillers, lubricants and colorants. Halogen is suspected to be in resins and flame retardants. UL uses the standard UL 62 which covers cables made of TPE material which is non-halogen to certify cables. Halogen-free cable materials are as follows:
– BFR/CFR/PVC Free;
– Polyethylene resin used with non-halogen flame retardants;
– Europe has accepted the use of non-halogen flame retardant PE and moisture-cured XLPE for insulation and jacketing in some flexible cords, appliance wires, building wire and many other end uses;
– Aluminum tri-hydrate [AL(OH)3] flame retardant is halogen free and its use is common;
– Calcium carbonate is used as a filler (halogen free).

Available documents for halogen-free materials
– JS709A, JEDEC publication: A Guideline for Defining – "Low-Halogen" Solid State Devices (Removal of BFR/CFR/PVC)
– IEC 61249-2-21: Materials for Printed Boards and Other Interconnecting Structures – Part 2-21 : Reinforced based materials, clad and unclad – non-halogenated epoxide woven E-glass reinforced laminated sheets of defined flammability (vertical burning test), copper clad
– IPC 4101-B: Specifications for Base Materials for Rigid and Multilayer Printed Boards
– J-STD-609: Marking, Symbols and Labels of Leaded and Lead-free terminal finish materials used in electronic assembly
– ISO 11469:2000(E): Plastics - Generic identification and marking of plastics products
– ISO 1043-4: Plastics - Symbols and abbreviated terms - Part 4: Flame retardants

Elements of power cords
There are three elements of a power supply cord, namely the mains plug; the cable or cordage; and the appliance connector, as described below.

1.) Mains plugs
The mains plug is a connector that plugs into a mains socket outlet (also known as receptacle). The mains plug:
- Can be hard-wired or molded on type. Power cord sets usually have a molded on type mains plug;
- Can be a two pin device (no ground pin or sometimes provided with a dummy ground pin). The two pins are for line and neutral connections;
- Can be a three pin device. The third pin is for protective earthing or ground connection.
- Usually requires approval from the certification agency of the country where the plug will be used;
- Is required to have partial insulating sleeves on line and neutral pins in some countries (for example

Australia, UK and Switzerland);

- Ground pin must never be sleeved.

Two pin plugs


EURO


China


USA


Argentina

Some country plugs require the use of a three pin plug for class II equipment. The plug must be provided with a dummy earth pin. The earth pin must be made of insulating material. In such a case, the pin is described (rather grandly) as an Insulated Shutter Opening Device (ISOD). The ISOD is needed because it opens the shutters on the socket for the live and neutral pins. It is also needed for polarity.

Three pin plugs


EURO


China


USA


Argentina


Italy

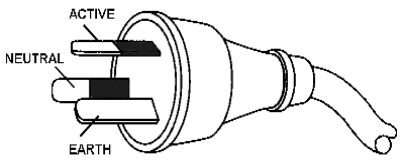

India


Demark


United Kingdom

Requirement for partially sleeving Line and Neutral pins of the mains plug

Required by many countries such as Australia, UK and Switzerland; EU two pin CEE 7/16 plug; and IEC 60906-1 and -2 standards require sleeves covering partially the line and neutral pins of the mains plug. This is to protect the individual's fingers from contacting the metal part of the plug pins in order to avoid any shock hazard that may be caused if the metal parts get touched during insertion or removal of the plug from the socket outlet. The body of the mains plug should be held by the hand when withdrawing the plug from the wall socket outlet. The protective earthing (grounding) pin must never be sleeved.



Australian plug


Thailand TIS 166 plug


UK plug

Plugs with insulated L and N terminals

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Hospital grade plugs

Power supply cords, power cord sets, and particularly the plugs on cords are subject to special rules in North America, Denmark, Japan and Australia/New Zealand if used in health care facilities. For all other regions, power supply cords and power cord sets for medical equipment throughout the world are no different than cords used for non-medical equipment.

For a hospital plug, the plug blades need to be of solid steel and not folded back type.

North America, Japan, Denmark and Australia/New Zealand are the only areas of the world which recommend the use of a clear plug for medical applications. North American hospital-grade plugs, connectors, and receptacles are required to carry the “green dot.”

"Green dot" marking

Standards for Mains plugs

- UL 498 in the U.S.;
- CSA C22.2 No. 42 in Canada;
- EN 60884-1 in EU member countries;
- IEC 60884-1 for National Standards in other countries;
- AS/NZS 3112 for Australia/New Zealand;
- IEC 60083 for National plug configurations.

Cambodia plugs

Plug certification by ISC and the application of the ISC mark is mandatory. However, if the plug is molded type and a single CB report for the cord is submitted to ISC, only a single ISC mark on the plug is sufficient. Cambodia standards are similar to IEC.

Saudi Arabia plugs

Starting May 21, 2012, Saudi Arabia has mandated the use of 230 V UK BS1363 type plugs only. U.S. type plugs are not permitted any more. For class II equipment, the ground pin may be a dummy pin.

Brazil plugs

All plugs must be INMETRO certified to Brazil standard NBR 14136 and marked with the INMETRO mark. They are similar to the Swiss plugs. Mandatory marking is required for the INMETRO mark along with the testing agency mark.

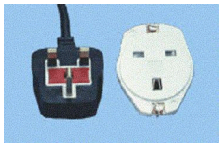
or

EURO or Schuko plugs

The wall socket outlets in the following countries may accept the EURO plug. Some countries may have their own certification requirements.

Albania
Algeria
Andorra
Angola
Armenia
Aruba
Austria
Azerbaijan
Azores(Portugal)
Balearic Islands
Belarus
Belgium
Bolivia
Bosnia & Herzegovina
Bulgaria
Burkina Faso
Burundi
Cambodia
Cameroon
Canary Islands(Sp.)
Cape Verde, Rep of
Central African Republic
Chad
Comoros
Congo, (Zaire) Dem Rep of the
Congo, Rep of the
Cote d'Ivoire (Ivory Coast)
Croatia
Curacao Is.
Czech Republic
Denmark
Djibouti
East Timor
Egypt
Equatorial Guinea
Eritrea
Estonia
Ethiopia
Faroe Islands
Finland
France
French Guiana (Guyana)
French Polynesia
Gabon
Georgia
Germany
Greece
Guadeloupe
Guinea
Guinea-Bissau
Hungary
Iceland
Indonesia
Iran
Italy
Ivory Coast
Jordan
Kazakhstan
Kyrgyzstan
Laos
Latvia
Lettonia
Lithuania
Luxembourg
Macedonia
Madagascar (Malagasy)
Majorca
Mali
Martinique
Mauritania
Mayotte
Moldavia
Moldova
Monaco
Mongolia
Morocco
Mozambique
Nether. Antilles
Netherlands
New Caledonia
Niger
Norway
Paraguay
Peru
Poland
Portugal
Reunion
Romania
Russia
Rwanda
Samoa
San Marino
Sao Tome & Principe
Saudi Arabia
Senegal
Serbia & Montenegro
Slovakia
Slovenia
Solomon Is.
Somalia
Spain
St. Helena
St. Maarten
Suriname
Svalbard (Norway)
Sweden
Syria
Tahiti
Tajikistan
Togo
Tunisia
Turkey
Turkmenistan
Ukraine
Uzbekistan
Vanuatu
Vietnam
Wallis & Futuna
Western Sahara
Sudan

UK BS1363 plugs



The wall socket outlets in the following countries may accept the UK BS1363 plug. Some countries may have their own certification requirements.

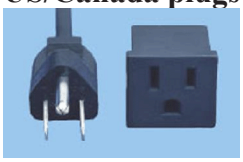
Anguilla (UK)
Antigua & Barbuda
Bahrain
Bangladesh
Botswana
Brunei
Channel Islands
Cyprus
Dominica
Falkland Islands
Gambia
Ghana
Gibraltar
Grenada
Guyana
Hong Kong
Iraq
Ireland
Isle of Man
Jordan
Kenya
Kuwait
Lebanon
Liberia
Macau
Malawi
Malaysia
Malta
Mauritius
Montserrat
Myanmar (Burma)
Nigeria
Oman
Pakistan
Pitcairn Is. (UK)
Qatar
Saudi Arabia
Scotland
Seychelles
Sierra Leone
Singapore
Sri Lanka (Ceylon)
St. Kitts & Nevis
St. Lucia
St. Vincent & Grenadines
Sudan
Tanzania
Trinidad & Tobago
Uganda
United Arab Emir.
United Kingdom
Vanuatu
Wales
Yemen
Zambia
Zimbabwe

UK old BS546 plugs

The wall socket outlets in the following countries may accept the UK old BS546 plug. Some countries may have their own certification requirements and minor changes in pin sizes.

Afghanistan
Bahrain
Bangladesh
Benin
Bhutan
Botswana
Burma (Myanmar)
Ghana
Grenada
Guyana
India
Iraq
Kenya
Kuwait
Lebanon
Lesotho
Libya
Macau
Madeira (Portugal)
Maldives
Mauritius
Namibia
Nepal
Nigeria
Oman
Pitcairn Island (U.K.)
Qatar
Seychelles
Sierra Leone
South Africa
Sri Lanka (Ceylon)
St. Kitts & Nevis
Swaziland
Tanzania
Tonga
Trinidad & Tobago
Uganda
United Arab Emir.
United Kingdom
Zimbabwe

US/Canada plugs



The wall socket outlets in the following countries may accept the U.S./Canada plug. Some countries may have their own certification requirements.

American Samoa
Aruba
Bahamas
Barbados
Belize (Br. Hond.)
Bermuda
Bolivia
British Virgin Islands
Canada
Cayman Islands
Colombia
Costa Rica
Cuba
Curacao Is.
Dominican Republic
Ecuador
El Salvador
Guam
Guatemala
Haiti
Honduras
Jamaica
Mexico
Micronesia
Montserrat
Nether. Antilles
Nicaragua
No. Mariana Is. (US)
Okinawa
Panama
Philippines
Puerto Rico
Saudi Arabia
St. Pierre & Miquelon
Thailand
Trinidad & Tobago
United States
US Virgin Islands
Venezuela
Vietnam

India Plug

This plug does not require certification to IS 1293. The IS 1293: 2005 was revised to be in line with IEC 60884-1 and was supposed to become mandatory from July 1, 2007, but the expected announcement never came. With the recent introduction of registration requirement by BIS by DEITY (Department of Industry and Technology) for IT and audio/video products, the power cord is considered a critical component. The plugs (and connectors) are accepted based on the following criteria as advised by DEITY in their “”Frequently asked Questions” document From Circular No. 1 of 2013.

Until further orders, safety critical components will be accepted based on their -

- *Compliance to relevant Indian Standard / IEC standard based on testing or*
- *Certification / Testing by any NCB / Test Lab under IECEE - CB scheme or IEC 17025 accredited laboratory, or*
- *Testing for suitability for applicability within the scope of equipment performed by the BIS Recognized Lab for the Product Standard. (This may be done as a part of equipment testing.)*

2.) Cable or cordage

The cable connects the mains plug to the appliance connector, or if hard wired to the terminals for supply connection provided in the equipment. It may be a round cable or a flat cable. They come in all sorts of sizes, shapes and designations.

North American cables

Examples of designations of cords used in Canada and the U.S. are types S, SV, SVT, SPT, SJ, SJT,

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Advantages of Membership in the IEEE PSES

Makes you part of a community where you will:

- Network with technical experts at local events and industry conferences.
- Receive discounts on Society conferences and symposiums registration fees.
- Participate in education and career development.
- Address product safety engineering as an applied science.
- Have access to a virtual community forum for safety engineers and technical professionals.
- Promotion and coordination of Product Safety Engineering activities with multiple IEEE Societies.
- Provide outreach to interested engineers, students and professionals.
- Have access to Society Publications.

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E-Mail List: http://www.ieee-pses.org/emc-pstc.html
Virtual Community: http://product-compliance.oc.ieee.org/
Symposium: http://psessymposium.org/

Membership: The society ID for renewal or application is “043-0431”.

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SJW, SJO and many others. The cables are required to be certified by UL/CSA as applicable.

Flame rating classifications for North American cables
UL 817 covers power supply cords, and this standard requires only seasonal cords to be VW-1 flame rated. Other type cables are not required to have a flame rating. However, UL 60950-1 does require interconnecting cables and internal wiring to be rated VW-1.

VW-1 flame rating criteria
– Flaming extinguishes within 60 s after each application of the flame;
– Cotton placed below the test fixture does not get ignited; and
– Charring of the cable does not exceed 25% of the sample length.
CSA's FT1 rating is similar to the above except there is no mention of cotton ignition.

OSHA (U.S.) requirements
– Only three conductor cord to be used in work place;
– All cords must be factory manufactured;
– Cords must be of hard usage type; and
– Modified cords shall not be used.

OSHA (U.S.) requirements for flexible cords
OSHA has specific requirements for flexible cords that are used in the work place. The following usage is prohibited, also by the *National Electrical Code*:
– As a substitute for fixed wiring;
– When run through holes in walls, ceilings or floors;
– When run through doorways or windows;
– When attached to building surfaces;
– When concealed by walls, ceilings or floors.
Flexible cords must be connected to devices and fittings in such a way so that any strain put on the cord is not transferred to the terminals.

Thailand
The cable needs to comply with Thai standard TIS 11 but if the plug and cable are imported as a whole, then there is no need for compliance with TIS 11. However local power cord manufacturers need to use TIS certified cable to build the power supply cord. It was announced that the plug needs to comply with TIS 166 but that announcement was withdrawn. TIS certification marks look like as given below.


Voluntary


Mandatory

India
Cable certification to Indian standard IS 694 by BIS (Bureau of Indian Standards) is mandatory. The ISI mark or CM/L number must be marked on the BIS certified cable.

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2014 IEEE Symposium on Product Compliance Engineering

Sponsored by the IEEE Product Safety Engineering Society

Now Held Earlier in the Year!

May 5-7, 2014
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The IEEE Product Safety Engineering Society seeks original and unpublished papers, presentations, workshops and tutorials on all aspects of product safety and compliance engineering including, but not limited to:

EMC Compliance
- Electromagnetic emissions, electromagnetic immunity, regulatory, introduction to EMC/RF (for safety engineer & compliance engineers)

Energy Storage
- Battery and energy storage designs, applications, manufacturing, testing and standards, including emerging chemistries, fuel cells, electrochemical capacitors (ultra-and super-capacitors), etc.

Forensics
- The latest findings in failure analysis
- General tools, techniques and best practices used for quality failure analysis

Hazard-based Safety Engineering
- Theory and application of HBSE
- New hazard-based standard for A/V, IT & Communication Technology Equipment, IEC 62368-1

Innovation
- Emerging uses of technology, and associated challenges with safety & compliance, such as those associated with 'smart' devices, wearable electronics, wireless power transfer, driverless cars, modular data centers, liquid cooling, PEDs/aircraft, virtual reality, technology & seniors, etc.

Leadership
- Management strategies and techniques, and case studies
- Leading change, team building, conflict resolution, time management
- Communication skills

Medical Devices
- IEC 60601-1, and collateral standards
- Risk Management process for medical devices
- Compliance strategies and options

Risk Analysis, Assessment & Management
- Fundamentals and application of risk analysis, assessment and management
- Introduction of risk management principles and requirements into new standards and applications

CALIFORNIA REPUBLIC

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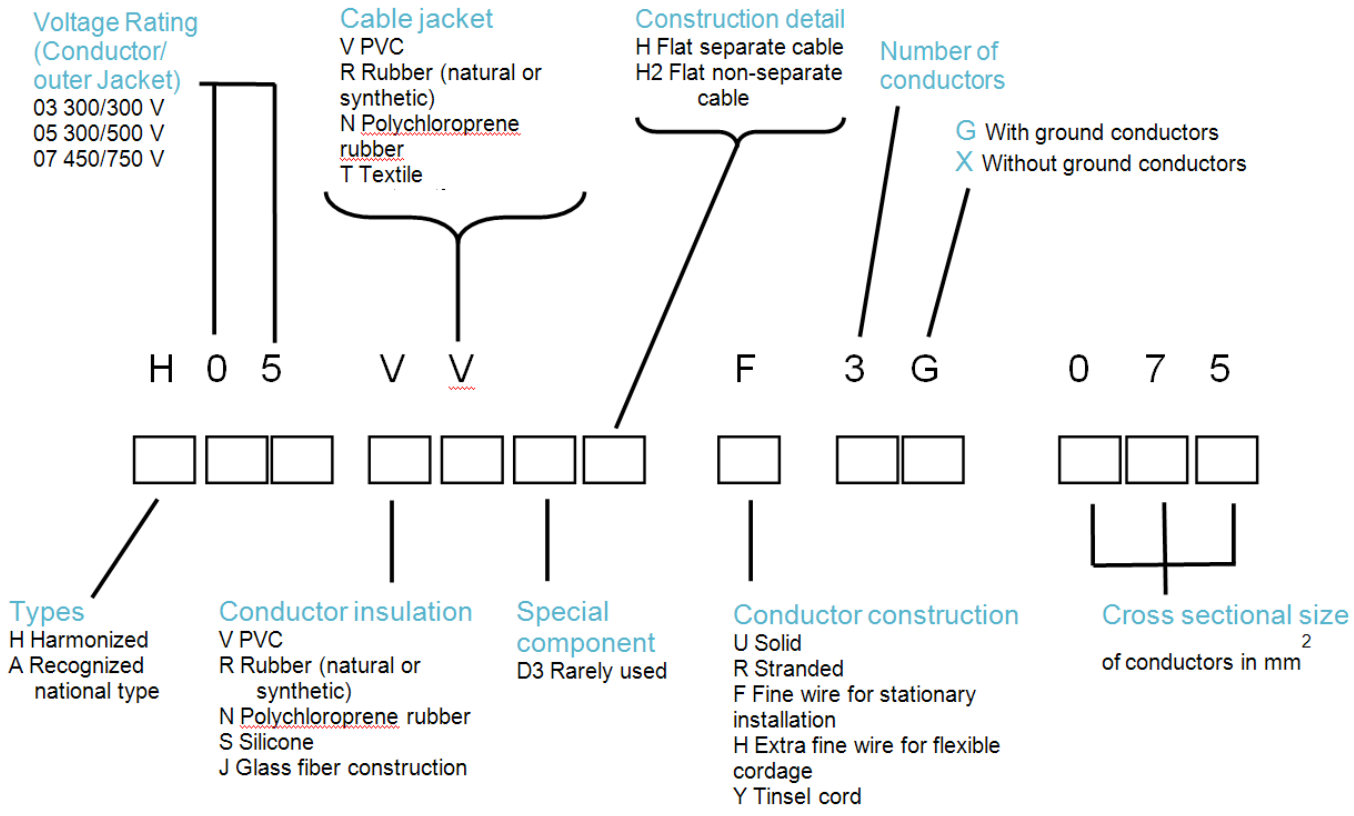
Harmonized cables for EU member countries

These are low voltage (50–1000 V ac) electrical cables and the program for these cables is administered by 19 European Certification Agencies. A HAR (<HAR>) mark is required on the cable in addition to other markings. It is followed by either the issuing agency's acronym or by a distinct barcode on the inside jacket of the product. The harmonized classification is marked on the cable. These are certified by EU test houses as required.



Cables for other countries

Other countries have their own cable types; flammability and certification requirements.

IEC requirements for flammability of cables

IEC 60332-1-2 and -2-2; and IEC/TS 60695-11-21 cover flammability of wires and cables. They are similar to U.S. requirements. Flaming criteria are:

– Flaming not longer than 60 s after each application of the flame;
– Drips from the specimen shall not ignite cotton; and
– Indicator flag shall not be damaged more than 25%.

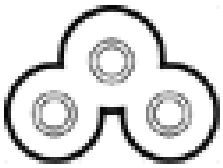
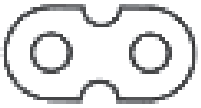
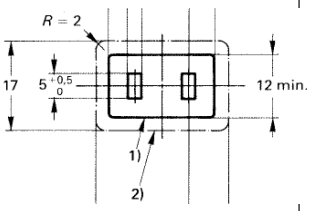
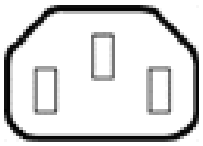
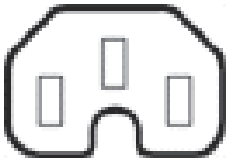
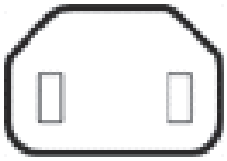
3.) Appliance connectors

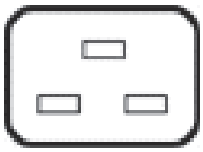
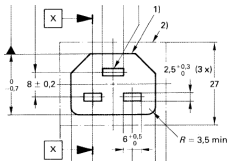
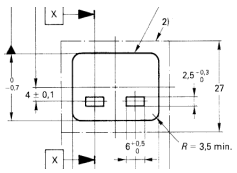
The connectors are classified as C1 to C24 (see IEC 60320-1). They are all rated 250 V but current ratings and temperature ratings are different. The designations with the odd numbers are appliance connectors (female connectors) and the even numbers are appliance couplers (male connectors). The following provides the different configurations and ratings.

The connector standards in the U.S.A are UL 498 and IEC 60320 series; and in Canada C22.2 No. 42 or IEC 60320 series.

Other countries have mostly IEC 60320 series for connectors.

The following table gives some of the connector configurations, their ratings and pictorial view.

Type	View	Picture
C1, C2 Rating: 0.2 A, 250 V 70 °C		 C1
C5, C6 Rating: 2.5 A, 250 V 70 °C		 C5
C7, C8, C8A, C8B Rating: 2.5 A, 250 V 70 °C		 C7
C9, C10 Rating: 6 A, 250 V 70 °C		 C9
C11, C12 Rating: ? A, ? V No information on this in IEC60320-1		
C13, C14 Rating: 10 A, 250 V 70 °C		 C13
C15, C16, C15A, C16A Rating: 10 A, 250 V 120 °C for C15 and C16 155 °C for C15A and C16A		 C15
C17, C18 Rating: 10 A, 250 V 70 °C		 C17

Type	View	Picture
C19, C20 Rating: 16 A, 250 V 70 °C		 C19
C21, C22 Rating: 16 A, 250 V 155 °C		 C21
C23, C24 Rating: 16 A, 250 V 70 °C		 C23

Ratings of power supply cords for general use

Current Ratings for power supply cords range from 0.5 A to 20 A (for most commonly used power cords; it does not include power cords for high power)

- 16 A Max – International
- 20 A Max – U.S./Canada

Rated voltage for power supply cords is usually 150 V, 250 V or 300 V (600 V for hard service cords in the U.S. and Canada). It may depend upon the supply voltage in the country. Typical supply voltages are:

- 100/120 Volts – North America, Venezuela, Colombia, Ecuador, Northern Caribbean Islands, Taiwan;
- 100V – Japan;
- 220 to 240V – Most of the rest of the world;
- Rated voltage of the cord set or plug may be higher than the supply voltage available in the country and that is perfectly okay.

Cord set rating is determined by the lowest rated component of the three. For example if the connector is rated 250 V, 10 A; cable is rated 300 V, 14 A; and the plug is rated 16A, 250 V, then the cord set will be 250 V, 10 A.

Power cord cable conductor sizes and color coding

U.S. and Canada

There are mainly two types of sizes for the cable in the power supply cord types used globally:

- AWG (American Wire Gauge) is used in North America;
- Sized in accordance with AWG system;

– Color Coding can be as follows:
    - Black, White, Green (U.S. and Canada only)
    - Black, White, Green/Yellow (U.S. and Canada only)
    - Brown, Blue, Green/Yellow (world)
– Jacket insulation is S, SV, SJT, SVT, SPT-2, etc. (in U.S. and Canada)

EU member countries
European Harmonized type cables do not use AWG but rather cross-sectional area of the conductors
– Sized in terms of the cross sectional area of the conductor (mm^2);
– Color coding is always Brown, Blue, Green/Yellow;
– Code example: H05VVF-3G 0.75mm^2.

Note: UL has adopted the Brown (hot), Blue (neutral), Green/Yellow (ground) color coding to assist manufacturers with wiring schematics. This does not mean the UL-approved cordage is approved for international use.

Power supply cord approvals
A majority of the major countries in the world require approval for the power supply cord coming to their country. Some require approval for all the elements of the power cord while many may accept the plug approval. The following countries require approval for the power supply cords (Plugs do not come under the low voltage directive (LVD) but power supply cords do come under the LVD.): Argentina, Australia, Brazil, Cambodia (plug only), China, Denmark, EU member countries, India (cable only), Israel, Italy, Japan, Korea (south), Japan, Switzerland, Taiwan, United Kingdom, South Africa and U.S./Canada.

The following countries may require certificate of compliance and may require application of the safety mark: Azerbaijan, Bahrain, Belarus, Ivory Coast, Egypt, Hong Kong, Indonesia, Jordan, Kazakhstan, Kuwait, Malaysia, Morocco, Nigeria, Saudi Arabia, Singapore, Tanzania, Tunisia, Turkmenistan, Ukraine and Uzbekistan and maybe others.

In general, all plugs, connectors and cordage must meet the national requirements in the country in which they are to be used. In addition:
– All components must bear the Approving Agency markings (on the components and packages if required);
– There are numerous power cord manufacturers in many countries;
– All North American cords must be UL listed / CSA certified. CSA accepts ~~∈~~ cUL power cords.

All cords must be tested during manufacturing for correct polarity and routine electric strength test.

It is better to keep all the certificates for plugs, cordage and connectors stored in a data base. You will need these often when some countries request them when equipment needs to clear customs. Some manufacturers keep the certificates stored at their website for download (this is very helpful).

RoHS requirements
Power cords must not contain substances that could harm the environment or human health. Substance

(material) restrictions are usually based on legal requirements, international treaties and conventions and specific country requirements. Restricted substances are Cadmium; Chromium; Mercury; Polybrominated Biphenyls (PBBs) and their Ethers and Oxides (PBDEs, PBBEs), including deca-BDE; Lead; and all the compounds containing these elements. Limits vary from 100 to 1000 ppm. You should check the actual limits and exemptions. Power cord manufacturers provide details of RoHS compliance on their websites.

In EU member countries, the Directive of the European Parliament and of the Council on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment, 2002/95/EC, January 2003, (RoHS Directive) applies.

Required documents
When you ship your product with the power cord, customs officials in various countries may require the following:
– Specification drawings;
– Vendor drawings;
– UL/CSA approval and other agency approval certificates for the plug, cordage, connector and the cord set as may be applicable;
– National certificates in some countries as applicable;
– EU testing agencies approval certificates for plugs, cordage and connectors as applicable.

Some countries may require that the importer of the power cord must have the certificate for the power cord in their own name. Some countries do not have any requirements for power cords shipped in the same box as the equipment but they may have requirements if the power cords are to be shipped separately. Power cord manufactures usually store certificates of approvals at their websites and these can be easily downloaded.

In addition, the power cord must be used correctly in the end product. The cord must be suitably rated for the end product. The materials used must be approved for the application and should be accompanied with valid approval certificates. The specification drawings may contain information about the following:
– Approved materials;
– Valid certificates;
– Notes that specify material types and country usage, required approvals, and Markings;
– RoHS compliance documents showing compliance with regulations.

EMC requirements
There are no EMC requirements for mains power supply cords as they are typically used in 50/60 Hz supply.

Lal Bahra works as a senior regulatory engineer at Dell Inc. These materials are not offered as and do not constitute legal advice or opinions. Seek independent legal advice with respect to compliance or any particular issue. The content of this document reflects the opinions of the author and may not reflect the opinions of Dell Inc.

Interlock Architectures - Pt. 1

Editor's note—This is the first in a seven-part series of articles reprinted through the courtesy of Doug Nix from postings on the Machinery Safety 101 blog (http://machinerysafety101.com).

Interlock Architectures - Pt. 1: What do those categories really mean?

by Doug Nix

It all started with EN 954-1

In 1995 CEN published an important standard for machine builders: EN 954-1, *Safety of Machinery – Safety Related Parts of Control Systems – Part 1: General Principles for Design.* [1] This standard set the stage for defining control reliability in machinery safeguarding systems, introducing the Reliability categories that have become ubiquitous. So what do these categories mean, and how are they applied under the latest machinery standard, ISO 13849-1? [2]

Circuit categories

The categories are used to describe system architectures for safety related control systems. Each architecture carries with it a range of reliability performance that can be related to the degree of risk reduction you are expecting to achieve with the system. These architectures can be applied equally to electrical, electronic, pneumatic, hydraulic or mechanical control systems.

Historical circuits

Early electrical "master-control-relay" circuits used a simple architecture with a single contactor, or sometimes two, and a single channel style of architecture to maintain the contactor coil circuit once the START or POWER ON button (PB2 in Figure 1) had been pressed. Power to the output elements of the machine controls was supplied via contacts on the contactor, which is why it was called the Master Control Relay or "MCR". The POWER OFF button (PB1 in Fig. 1) could be labeled that way, or you could make the same circuit into an Emergency Stop by simply replacing the operator with a red mushroom-head push button. These devices were usually spring-return, so to restore power, all that was needed was to push the POWER ON button again (Figure1).

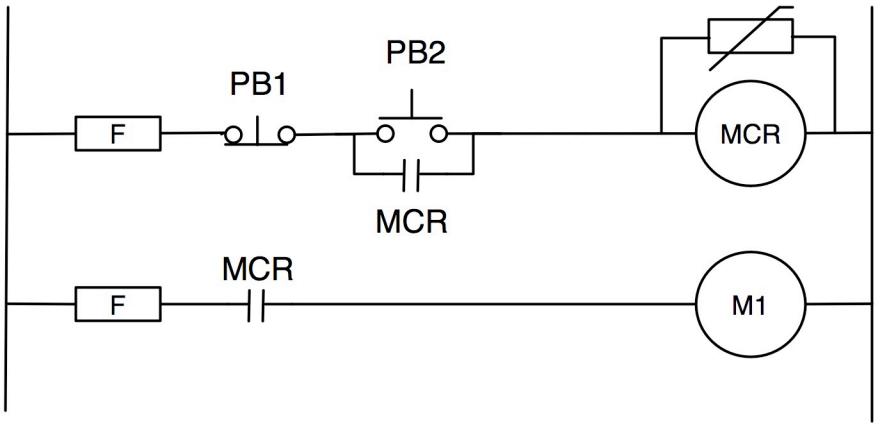


Figure 1 – Basic stop/start circuit

Typically, the components used in these circuits were specified to meet the circuit conditions, but not more. Controls manufacturers brought out over-dimensioned versions, such as Allen-Bradley's Bulletin 700-PK contactor which had 20 A rated contacts instead of the standard Bulletin 700 10 A contacts.

When interlocked guards began to show up, they were integrated into the original MCR circuit by adding a basic control relay (CR1 in Figure 2) whose coil was controlled by the interlock switch(es) (LS1 in Figure 2), and whose output contacts were in series with the coil circuit of the MCR contactor. Opening the guard interlock would open the MCR coil circuit and drop power to the machine controls. Very simple.

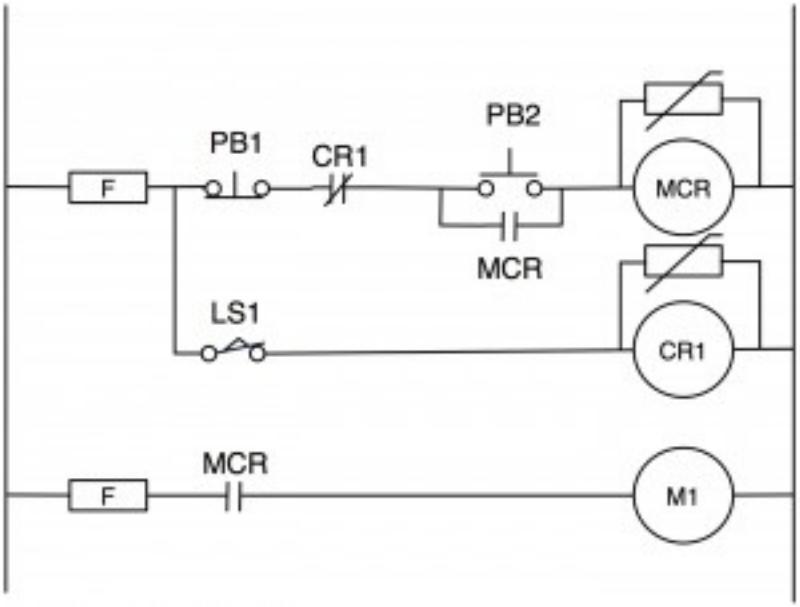


Figure 2 - Old-school start/stop circuit with guard relay

"Ice-cube" style plug-in relays were often chosen for CR1. These devices did not have "force-guided" contacts in them, so it was possible to have one contact in the relay fail while the other continued to operate properly.

LS1 could be any kind of switch. Frequently a "micro-switch" style of limit switch was chosen. These snap-action switches could fail shorted internally, or weld closed and the actuator would continue to work normally even though the switch itself had failed. These switches are also ridiculously easy to bypass. All that is required is a piece of tape or an elastic band and the switch is no longer doing its job.

Photo 1 – Micro-Switch style limit switch used as a cover interlock switch in a piece of industrial laundry equipment

The problem with these circuits is that they can fail in a number of ways that aren't obvious to the user, with the result being that the interlock might not work as expected, or the Emergency Stop might fail just when you need it most.

Modern circuits

Category B

These original circuits are the basis for what became known as "Category B" ("B" for Basic) circuits. Here's the definition from the standard. Note that I am taking this excerpt from [2]. "SRP/CS" stands for "Safety Related Parts of Control Systems":

> **6.2.3 Category B** The SRP/CS shall, as a minimum, be designed, constructed, selected, assembled and combined in accordance with the relevant standards and using basic safety principles for the specific application to withstand
>
> - the expected operating stresses, e.g. the reliability with respect to breaking capacity and frequency,
> - the influence of the processed material, e.g. detergents in a washing machine, and
> - other relevant external influences, e.g. mechanical vibration, electromagnetic interference, power supply interruptions or disturbances.
>
> There is no diagnostic coverage (DC_{avg} = none) within category B systems and the $MTTF_d$ of each channel can be low to medium. In such structures (normally single-channel systems), the consideration of CCF (common cause failures) is not relevant.
>
> The maximum PL achievable with category B is PL = b.

NOTE: When a fault occurs it can lead to the loss of the safety function.

Specific requirements for electromagnetic compatibility are found in the relevant product standards, e.g. IEC 61800-3 for power drive systems. For functional safety of SRP/CS in particular, the immunity requirements are relevant. If no product standard exists, at least the immunity requirements of IEC 61000-6-2 should be followed.

The standard also provides us with a nice block diagram of what a single-channel system might look like:

Key

i_m interconnecting means
I input device, e.g. sensor
L logic
O output device, e.g. main contactor

Figure 8 — Designated architecture for category B

Category B designated architecture (Figure 8 of ISO 13849-1)

If you look at this block diagram and the Start/Stop Circuit with Guard Relay above, you can see how this basic circuit translates into a single channel architecture, since from the control inputs to the controlled load you have a single channel. Even the guard loop is a single channel. A failure in any component in the channel can result in loss of control of the load.

Lets look at each part of this requirement in more detail, since each of the subsequent Categories builds upon these BASIC requirements.

“The SRP/CS shall, as a minimum, be designed, constructed, selected, assembled and combined in accordance with the relevant standards and using **basic safety principles** for the specific application...”

Basic safety principles

We have to go to ISO 13849-2 [3] to get a definition of what Basic Safety Principles might include. Looking at Annex A.2 of the standard we find:

Table A.1 — Basic Safety Principles

Basic Safety Principles	Remarks
Use of suitable materials and adequate manufacturing	Selection of material, manufacturing methods and treatment in relation to, e. g. stress, durability, elasticity, friction, wear, corrosion, temperature.
Correct dimensioning and shaping	Consider e. g. stress, strain, fatigue, surface roughness, tolerances, sticking, manufacturing.
Proper selection, combination, arrangements, assembly and installation of components/systems.	Apply manufacturer's application notes, e. g. catalogue sheets, installation instructions, specifications, and use of good engineering practice in similar components/systems.
Use of de–energisation principle	The safe state is obtained by release of energy. See primary action for stopping in EN 292–2:1991 (ISO/TR 12100-2:1992), 3.7.1. Energy is supplied for starting the movement of a mechanism. See primary action for starting in EN 292–2:1991 (ISO/TR 12100-2:1992), 3.7.1. Consider different modes, e. g. operation mode, maintenance mode. This principle shall not be used in special applications, e. g. to keep energy for clamping devices.
Proper fastening	For the application of screw locking consider manufacturer's application notes. Overloading can be avoided by applying adequate torque loading technology.
Limitation of the generation and/or transmission of force and similar parameters	Examples are break pin, break plate, torque limiting clutch.
Limitation of range of environmental parameters	Examples of parameters are temperature, humidity, pollution at the installation place. See clause 8 and consider manufacturer's application notes.
Limitation of speed and similar parameters	Consider e. g. the speed, acceleration, deceleration required by the application
Proper reaction time	Consider e. g. spring tiredness, friction, lubrication, temperature, inertia during acceleration and deceleration, combination of tolerances.
Protection against unexpected start–up	Consider unexpected start-up caused by stored energy and after power "supply" restoration for different modes as operation mode, maintenance mode etc. Special equipment for release of stored energy may be necessary. Special applications, e. g. to keep energy for clamping devices or ensure a position, need to be considered separately.
Simplification	Reduce the number of components in the safety-related system.
Separation	Separation of safety-related functions from other functions.
Proper lubrication	—
Proper prevention of the ingress of fluids and dust	Consider IP rating [see EN 60529 (IEC 60529)]

As you can see, the basic safety principles are pretty basic - select components appropriately for the application, consider the operating conditions for the components, follow manufacturer's data, and use de-energization to create the stop function. That way, a loss of power results in the system failing into a safe state, as does an open relay coil or set of burnt contacts.

"...the expected operating stresses, e.g. the reliability with respect to breaking capacity and

frequency,"

Specify your components correctly with regard to voltage, current, breaking capacity, temperature, humidity, dust,...

"...other relevant external influences, e.g. mechanical vibration, electromagnetic interference, power supply interruptions or disturbances."

"Specific requirements for electromagnetic compatibility are found in the relevant product standards, e.g. IEC 61800-3 for power drive systems. **For functional safety of SRP/CS in particular, the immunity requirements are relevant.** If no product standard exists, at least the immunity requirements of IEC 61000-6-2 should be followed."

Probably the biggest "gotcha" in this point is "electromagnetic interference." This is important enough that the standard devotes a paragraph to it specifically. I added the bold text to highlight the idea of "functional safety." You can find other information in other articles posted on the MS101 blog on this topic. An excellent source of information on EMC and Functional Safety is the IET's handbook, "Electromagnetic Compatibility for Functional Safety." [4] You can download this reference for free from the IET, and you will find some additional guidance materials there that will also be helpful. The link to this material is included the list of links at the end of this article.

If your product is destined for the European Union (EU), then you will almost certainly be doing some EMC testing, unless your product is a "fixed installation." If it's going to almost any other market, you probably are not undertaking this testing. So how do you know if your design meets these criteria? Unless you test, you don't. You can make some educated guesses based on using sound engineering practices, but after that you can only hope.

Diagnostic coverage
"...There is no diagnostic coverage (DC_{avg} = none) within category B systems..."

Category B systems are fundamentally single channel. A single fault in the system will lead to the loss of the safety function. This sentence refers to the concept of "diagnostic coverage" that was introduced in ISO 13849-1:2006, but what this means in practice is that there is no monitoring or feedback from any critical elements. Remember our basic MCR circuit? If the MCR contactor welded closed, the only diagnostic was the failure of the machine to stop when the emergency stop button was pressed.

Component failure rates
"...the $MTTF_d$ of each channel can be low to medium."
This part of the statement is referring to another new concept from [2], "$MTTF_d$". Standing for "Mean Time to Failure Dangerous," this concept looks at the expected failure rates of the component in hours. Calculating $MTTF_d$ is a significant part of implementing the new standard. From the perspective of understanding Category B, what this means is that you do not need to use high-reliability components in these systems.

Common cause failures
"In such structures (normally single-channel systems), the consideration of CCF is not relevant."

CCF is another new concept from [2], and stands for "Common Cause Failure." I'm not going to get into this in any detail here, but suffice to say that design techniques, as well as channel separation (impossible in a single channel architecture) and other techniques are used to reduce the likelihood of CCF in higher reliability systems.

Performance levels
"The maximum PL achievable with category B is PL = b."

PL stands for "Performance Level," divided into five degrees from a to e. PL_a is equal to an average probability of dangerous failure per hour of $\geq 10^{-5}$ to $< 10^{-4}$ failures per hour. PL_b is equal to $\geq 3 \times 10^{-6}$ to $< 10^{-5}$ failures per hour or once in 10,000 to 100,000 hours, to once in 3,000,000 hours of operation. This sounds like a lot, but when dealing with probabilities, these numbers are actually pretty low.

If you consider an operation running a **single shift** in Canada where the normal working year is 50 weeks and the normal workday is 7.5 hours, a working year is

7.5 h/d x 5 d/w x 50 w/a = 1875 hours/a

Taking the failure rates per hour above, yields:
PL_a = one failure in 5.3 years of operation to one failure in 53.3 years
PL_b = one failure in 1600 years of operation

If we go to an operation running **three shifts** in Canada, a working year is:

7.5 h/shift x 3 shifts x 5 d/w x 50 w/a = 5625 hours/a

Taking the failure rates per hour above, yields:
PL_a = one failure in 1.8 years of operation to one failure in 17 years
PL_b = one failure in 533 years of operation

Now you should be starting to get an idea about where this is going. It's important to remember that probabilities are just that—the failure could happen in the first hour of operation or at any time after that, or never. These figures give you some way to gauge the relative reliability of the design, and ARE NOT any sort of guarantee.

References

[1] Safety of Machinery - Safety Related Parts of Control Systems - Part 1: General Principles for Design. CEN Standard EN 954-1. 1996.
[2] Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design. ISO Standard 13849-1, 2nd Ed. 2006.
[3] Safety of machinery — Safety-related parts of control systems — Part 2: Validation. ISO Standard 13849-2, 2nd Ed. 2012.
[4] Electromagnetic Compatibility for Functional Safety. The Institution of Engineering and Technology. Stevenage, UK. 2008.

Web Links

Allen-Bradley 700PK relay catalog data: http://www.ab.com/en/epub/catalogs/12768/229240/229266/229661/3087128/229735/index.html

IET Guide downloads: www.theiet.org/factfiles/emc/emc-factfile.cfm

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New PSES Members

from 13 June 2013 through 18 Sep 2013

Our new members are located in the following countries: Canada, Italy, Japan, Mexico, Philippines, Qatar, Saudi Arabia, Switzerland, and USA

Bruce Koch
Curtis Thornburg
Daniel Lawrence Garcia
Emmanuel A Gonzalez
Francisco Merin Ramos
George Pletyuk
Glen Alan Burgess
Ivan Luigi Spano
Jatinder Verma
Mike Yramategui
Mustafa Adnan Al Ramadhan
Ophir Kendler
Oscar Moreno
Patrick Probst
Pavel Jirousek
Richard Wright
Terrance Anthony Woodyard
Timothy J Walsh
Umberto Santoni
Walter Babcock Palmer III
Yasushi Mori

of the World."

I completely agree with Ghery Pettit, President of the IEEE Electromagnetic Compatibility Society, who in the 2012 IEEE EMC Magazine, Volume 1, Quarter 2 issue wrote: "For those of us who have been members seemingly forever and have been attending this annual Symposium for years, we know what it offers and why we make the pilgrimage as often as possible."

Give it a try…join the party…teach, learn (or both) and…have fun…you may have missed 2013, but do not miss 2014. **ISPCE 2014 will be our 10th annual symposium.** Plan to be there.

What did you Miss?
Although this message was written BEFORE the start of the Symposium, I can say, from closely reviewing the hard work put into the preparation of the Symposium, that if you did not attend the symposium (and statistically, most likely that you did not), you missed at least the following:

Exchange of Professional Knowledge
"Sharing knowledge is not about giving people something, or getting something from them. That is only valid for information sharing. Sharing knowledge occurs when people are genuinely interested in helping one another develop new capacities for action; it is about creating learning processes." (Peter Senge)

The symposium gives us the best opportunity to learn from our peers but also provides an opportunity to tell them about our work. **No one** is "Mr. Know All." We all can learn something new, and as an old Jewish scholar said: "*I have learnt much from my teachers, but from our students I have learnt even more*." (Shimon Ben Zoma, a 2nd Century Jewish Scholar, based on Psalms, 119:99). I truly believe, from personal experience, that even when you are a speaker, you have much to learn from the questions and comments of others.

The technical exhibition during the symposium is an extra added value to attendees. Not only are the exhibitors major supporters of our symposium, but also visiting the exhibition, meeting the exhibitors face to face, is an outstanding opportunity to learn about new products and services, which benefit both you personally and the company you work for. (Now here is a good case for attending the Symposium.) This is so much better than downloading the catalog, isn't it?

Networking
"Knowledge is embodied in people gathered in communities and networks. The road to knowledge is via people, conversations, connections and relationships. Knowledge surfaces through dialog, all knowledge is socially mediated and access to knowledge is by connecting to people that know or know who to contact." (Denham Grey)

Networking is not disconnected from knowledge. Networking is one manner of gaining knowledge, but also of one more important aspect: **human contact**. Social media are great, LinkedIn and Listserv forums can provide many answers to technical questions, but as quoted above, "… *all knowledge is* ***socially mediated*** *and access to knowledge is by* ***connecting to people*** *that know or know who to contact*".

As I had previously mentioned, symposium [sym·po·si·um] is indeed "a meeting or conference for the discussion of some subject, especially a meeting at which several speakers talk on or discuss a topic before an audience." That is your professional education, but it also means (in ancient Greece and Rome) "a convivial meeting, usually following a dinner, for drinking and intellectual conversation."

Our annual symposium is indeed THE event of the year when you come together with your fellow "safety gurus." Meet, celebrate, discuss and… enjoy! **Salut!**

Technical Committees (TCs)
I guess many of you do not even know that PSES has ACTIVE technical committees. The Symposium is the one place where the committee

members meet face to face, but not only that; this is the opportunity to join a meeting (the meetings are open!), share your thoughts, ask questions, and listen.

I envision for the TCs a major role in PSES. TCs should serve as the core of knowledge in PSES. They should lead the technical activities in the Society, organize technical activities, generate content and review papers submitted to the Symposium. Our TCs are led by and include the top notch experts in the society, but also novices and beginners. No one is excluded! All you must do is step in, sign in, and you are a member. Contact our VP for Technical Services, Ivan VanDeWege <IVandewege@caseforensicscorp.com> for more information on TC activities and volunteering opportunities.

Awards and Recognition

2013 is the first year that PSES is formally recognizing its dedicated volunteers for their selfless efforts along the years, as well as "best papers," Chapter of the Year," etc. We are all volunteers and therefore, we receive no tangible pay for our work. As written in the old books, the greatest reward of a good deed is the good deed itself. But regarding recognition, "There are two things people want more than sex and money... recognition and praise". (Mary Kay Ash).

Consider nominating your colleague(s) for next year's awards. Surely you know someone who has a great achievement, as done something exceptionally important for the society or the discipline. The person you nominate this year will receive it (if approved) in ISPCE 2014.

Chapter Activities

Are you a member of an active chapter? No? Would you like to start one up? Chapter Chairs (or their representatives) came together at the symposium to discuss issues of interest to those leading chapters, or wishing to start one. The chapter is where networking, technical information exchange and social activities all come together. I have often been quoted saying "The chapter is where it all happens." If you have not visited or attended a chapter meeting, you may not know what you are missing.

Contact our VP for Member Services, Thomas Ha (tom@gmcompliance.com) for more information on Awards and Chapter activities as well as any other issue related to members and chapter development activities.

Looking further ahead to Santa Clara, CA (ISPCE 2014)

*"*Time flies. It's up to you to be the navigator.*"* (Robert Orben)

Santa Clara, CA in 2014—it still seems a long way down the road. But time flies. Before we know it, this future symposium will be upon us, especially since it is moved to mid-2014. The General Chair is Mr. Kevin Ravo, PSES President-Elect. The 2014 ISPCE is a special event for PSES, as it marks the 10th anniversary of the symposium. We have chosen to go back to our roots in Santa Clara for this special event.

In light of the current economic situation, attending the symposium might not look realistic, but, and with a little optimism, cutbacks should not last too long.

So plan ahead! Submit your papers to ISPCE 2014 (the call for papers will have been published by the time you read this column). I look forward to meeting you all in Santa Clara. After all, the Symposium is essentially where we learn our trade.

PSES BOD Meetings

Again, I would like to reiterate that all meetings of the Society Board of Directors are open and you are most welcome to attend. We try to schedule our BoD meetings so as to reach out to you, and we hope that you reach out to us and honor us by attending. As I have said in the past, you are not restricted to being a "silent observer" in the meetings. Indeed, you may talk and express your opinions, make suggestions and take part in our activities. The schedule of BoD meetings is

posted on the Society web site (http://ewh.ieee.org/soc/pses/) and in the Calendar section of this Newsletter.

If you wish to join our telecons (we normally hold monthly telecons) just inform Society Secretary, Daniece Carpenter Daniece_Carpenter@DELL.COM and you will receive the invitation to join.

"And now, the End is near…"

And now, the end is near;
And so I face the final curtain.
My friend, I'll say it clear,
I'll state my case, of which I'm certain.
("My Way", Paul Anka/Frank Sinatra)

As I write this last "President's Message" with my term as your President is winding down I wish to begin my final message by welcoming our incoming President, Kevin Ravo.

*"*One generation passeth away, and another generation cometh; and the earth abideth for ever.*"* So spoke Koheleth, also known as King Solomon the wisest man of all (Ecclesiastes Chapter 1). This theme—of endings leading to new beginnings—which I reflected on in my opening remarks nearly two years ago applies just as much in my final remarks.

Such is the nature of the leadership of our Society: On January 1, 2014, Kevin will take over as our gallant new President and become the "receiver of 10,000 e-mails" (we wish!) while I, on the other hand, will assume the fortunate role of Immediate Past President and "forwarder of IEEE e-mail to the new President" (adapted from EMCS's Todd Hubing's President's Column, Fall, 2003). But just as it is said in the Holy Books, "*the earth abideth for ever*," I believe our still very young Society is well-positioned to reach even greater heights in future, building upon its past accomplishments.

Most of us involved in the Society doubtlessly know Kevin as an enthusiastic and hard-working volunteer, dedicated to the growth and globalization of our Society. As Kevin navigates the course ahead, I have no doubt that he will put down his mark on the PSES in many positive ways.

Kevin was also kind enough to write an introductory column in this Newsletter.

*"*This is not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning.*"* (Winston Churchill)

In 2013, almost unnoticed, PSES commemorated its 10th anniversary. During my term as President, I had the privilege of crossing this door step, into our next decade. This special event, as we complete our 10th year, will be, doubtlessly celebrated in Santa Clara, in the ISPCE 2014 Symposium.

Much more to do…

"Regrets, I've had a few;
But then again, too few to mention.
I did what I had to do
And saw it through without exemption.

"Yes, there were times, I'm sure you knew
When I bit off more than I could chew.
But through it all, when there was doubt,
I ate it up and spit it out.
I faced it all and I stood tall;
And did it my way."

("My Way", Paul Anka/Frank Sinatra)

It is said that *"*Man proposes, the Lord Disposes.*"* At the start of my term I had many more plans than was able to accomplish in such a relatively short term. I envisioned, creating an educational Committee, restructuring the technical committees, forming more chapters, initiating additional and joint conferences with sister societies, and more. But, *"*you can't bite off more than you can chew.*"* Budgets and especially time resources are limited. Things are therefore left for my successors.

The Show Must Go On…

*"*I have named the destroyers of nations: comfort, plenty, and security—out of which grow a bored and slothful cynicism, in which rebellion against the world as it is, and myself as I am, are

submerged in listless self-satisfaction." (John Steinbeck, Novelist and Writer, 1962 Nobel Prize for Literature Recipient)

I wish to apply John Steinbeck's clever observations to the PSES: The Society was faced with, and successfully overcame, numerous challenges along recent years, but the biggest danger of all still awaits us—that of **self-satisfaction**.

*"*Turbulence is life force. **It is opportunity**. **Let's love turbulence and use it for change**.*"* (Ramsay Clark)

Let us strive to further build upon the foundations set by our predecessors. For that to occur, however, **the support, commitment and active contribution of our main stakeholders – our members and volunteers—YOU, are indispensable**.

Someone said that the best way to take full advantage of your membership benefits was to volunteer. I wholeheartedly agree! The spirit of IEEE is embedded in its letters: ***I****nspire,* ***E****nable,* ***E****mpower,* ***E****ngage*. **Volunteering is for everyone**. Some of us just discover that later than others; so why wait?

Autumn (or Fall)…

"We cling to our own point of view, as though everything depended on it. Yet our opinions have no permanence; like autumn and winter, they gradually pass away." (Zhuangzi)

And again, Autumn (or Fall) has come. Again, the seasons of the year teach us that *"*One generation passeth away, and another generation cometh; and the earth abideth for ever.*"* (Ecclesiastics). But there is a lesson to be learned there. Just as quoted from Einstein: "*Life is like riding a bicycle. To keep your balance you must keep moving*" (Albert Einstein).

Fall (or Autumn, as it is called in some places of the World) is around the corner with its cool, dark, sometimes gloomy days. But, it is part of a cycle! After Fall comes Winter, which brings New Year—yet another beginning—for the individual, for the PSES, for society, and for humanity in general. But the cycle of seasons teaches us yet another lesson: We cannot cling to one season, to one notion, to one paradigm. To keep the PSES on balance we must keep on moving. The winds of change MUST blow. Change is the basis of progress. As Einstein is believed to have said "Insanity is doing the same thing, over and over again, but expecting different results."

As you sit at home in your warm home (or for the southern hemisphere, I guess in your warming up home, as you emerge into summer), think about what YOU can do for the Society. How can WE make it OUR professional home? How can WE better the offerings that we provide our members?

I, as your President am at your service. Take the time to write to me (eb.joffe@ieee.org) or to our President Elect, Kevin Ravo (Kevin.L.Ravo@ul.com). We want to hear from you and promise that no message will remain unanswered.

Elya B. Joffe, President, PSES

Ravo Continued from Page 1

tification, to standards development, to program design and strategic and general management. So while it may look like the same job at the same place, it has really been like working at a number of different companies doing different jobs. For more on my background, please see my LinkedIn Profile at: http://www.linkedin.com/pub/kevin-ravo/0/751/645/

One of my outside activities that has contributed to my opportunities over the years is my involvement in the IEEE, in particular the PSES. The PSES is a very diverse community, one where there is much opportunity for networking, learning and growth. There are opportunities with the IEEE and PSES for learning, leadership, etc. I have also observed the PSES to be a great network that was effectively used by those seeking to try something different. It has been a great experience for me with personal and professional benefits— if you are not a member I encourage you to join and if/when you are a member I encourage you to be active in your local Chapter or the larger Society.

Looking forward to the next two years as President of the PSES, I would like to focus in particular on the following— all intended to add more value from the Society to you our members:

- **Continue growing membership.** With more members, we can do more for all members via education programs, symposia/conferences, etc. and we will have an even stronger network!
- **Communication.** Better ways of sharing information, opportunities and hearing from you what would be of value. Watch for a survey to come in the future.
- **Member Involvement.** This is where we all can really realize the benefits of membership. I have learned so much about the opportunities and benefits of membership as I have gotten more involved in the IEEE PSES. Whether it is a much broader network of contacts or varied learning opportunities, etc., at the Chapter, Society and Section level as well. I would like to work with you to get more of our members involved to bring in new ideas and make more of these types of opportunities available to all.

Of course there are other things that we need to address as we continue our growth as a Society, but for me, these are the key focus areas for now. I hope to hear from you to further tune these and perhaps change or add more. After all, this is about you and not me. This is a place to start and hopefully with this we can continue our progress of growth as a sustainable society that really provides value to our members and is a model of success in the IEEE.

I look forward to the next two years and working with many more of you than those I have worked with already, or at least hearing from you!

Again, I encourage you to join if you are not already a member and get involved, even in a small way. You will start to realize more of the many benefits we have to offer and you can contribute to the success of our Society!

Sincerely,

Kevin Ravo

Institutional Listings

We invite applications for Institutional Listings from firms interested in the product safety field. An Institutional Listing recognizes contributions to support publication of the IEEE Product Safety Engineering Newsletter. To place ad with us, please contact Jim Bacher at j.bacher@ieee.org

The Product Safety Engineering Newsletter is published quarterly during the last month of each calendar quarter. The following deadlines are necessary in order to meet that schedule.

Closing dates for submitted articles:

1Q issue: February 1
2Q issue: May 1
3Q issue: August 1
4Q issue: November 1

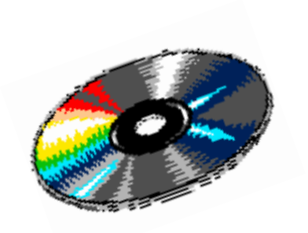
Closing dates for news items:

1Q issue: February 15
2Q issue: May 15
3Q issue: August 15
4Q issue: November 15

Closing dates for advertising:

1Q issue: February 15
2Q issue: May 15
3Q issue: August 15
4Q issue: November 15

Past IEEE-PSES Symposium Records



CD Purchasing Information

SYMPOSIUM PAPERS ON CD:

The Product Safety Engineering Society continues to offer past symposium records for sale on CDs. The cost for the CD is $35 plus shipping and handling for IEEE members; $50 plus shipping and handling for non-IEEE members. At this time, check or money orders are the means for payment. Please provide the following information:

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