STRATEGIC POLICY STATEMENT

IEC/TC or SC	Secretariat	Date
TC22	Switzerland	2007-10-26

Please ensure this form is annexed to the Report to the Committee of Action if it has been prepared during a meeting, or sent to the Central Office promptly after its contents have been agreed by the committee.

Title of TC

TC 22 Power Electronic Systems and Equipment
SC 22E Stabilized Power Supplies
SC 22F Power Electronics for Electrical Transmission and Distribution Systems
SC 22G Adjustable Speed Electric Drive Systems Incorporating Semiconductor Power Converters
SC22H Uninterruptible Power Systems (UPS)

A. Background

Scope

TC 22 Power Electronic Systems and Equipment

To prepare international standards regarding systems, equipment and their components for electronic power conversion and electronic power switching, including the means for their control, protection, monitoring and measurement.

Note 1.- Components which are comprised within the scope include electronic devices.
Note 2.- The scope does not include telecommunications apparatus other than power supplies to such apparatus.

SC 22E Stabilized power supplies

To prepare international standards for all aspects of low voltage stabilized d.c. power supplies. This includes amongst others: EMC, safety, system aspects, specifications and performance.
Note - With regard to EMC and Safety, this will be restricted to Stabilized Power Supplies for use in applications within the scopes of IEC 61010-1, IEC 60601-1, IEC 60950, IEC 60065 and DC Centralized Power Systems.

SC 22F Power Electronics for Electrical Transmission and Distribution Systems

To prepare international standards regarding electronic power conversion and/or semiconductor switching equipment and systems and their application to electrical transmission and distribution systems, including the means for their control, protection and monitoring. Typical examples are converters for High Voltage d.c. (HVDC), Static Var Compensators (SVC), Controlled Series Capacitors (CSC) as well as other applications where power electronics and semiconductors are used, e.g. phase shifters and active filters.

SC 22G Adjustable Speed Electric Drive Systems Incorporating Semiconductor Power Converters

To prepare international standards for electronic power conversion equipment in adjustable speed electric drive systems, including the means for their control, protection, monitoring, measurement, and including their extension to the system aspects.
To advise on special requirements for components and other equipment within the adjustable speed drive system.
Excluded are traction applications and electric vehicles.

SC 22H Uninterruptible Power Systems (UPS)

To prepare international standards for uninterruptible power systems (UPS) including system aspects as well as equipment and component requirements specific for UPS.

Working Groups

TC22 / MT3 Maintenance Team for IEC 60146 series and IEC 61148

TC22 / MT4	Maintenance Team for IEC 62103
TC22 / PT5	Safety requirements for power semiconductor converter systems (PSCS) - Part 1: General requirements (IEC 62477)
SC22E / WG2	Safety product standards for power supplies
SC22E / MT2	Maintenance Team for IEC61204 Ed1.1
SC22E / MT3	Maintenance Team for IEC60478-5 to be disbanded
SC22E / MT5	Maintenance Team for IEC61204-3
SC22E / MT6	Maintenance Team for IEC61204-6
SC22E / MT7	Maintenance Team for IEC61204-7
SC22F / MT9:	Maintenance Team for IEC 60700-1
SC22F / MT10:	Maintenance Team for IEC 61954
SC22F / MT11:	Maintenance Team for IEC 60919 –1, -2, -3
SC22F / MT13	Maintenance Team for IEC 60633
SC22F / MT14	Maintenance Team for IEC 61803
SC22F / WG12	High voltage direct current (HVDC) substation audible noise (future IEC 61973 Ed. 1)
SC22F / WG15	Electrical testing of voltage sourced converter (VSC) valves for high-voltage direct voltage (HVDC) power transmission (future IEC 62501, Ed. 1)
SC22F / WG16	General guidelines for the design of ground electrodes for high-voltage direct current (HVDC) links (future IEC 62344, Ed. 1)
SC22F / WG17	System tests for high-voltage direct current (HVDC) installations (future IEC 61975, Ed. 1)
SC22F / WG18	Guide to the specification and design evaluation of AC filters for high-voltage direct current (HVDC) systems (future IEC 62001, Ed. 1)
SC22F/TC33 JWG:	Thyristor controlled series capacitors (future IEC 60143 - 4, Ed. 1)
SC22G / MT7:	Maintenance of IEC 61800-3: Adjustable speed electrical power drive systems - Part 3: EMC product standard including specific test methods
SC22G / MT9:	Adjustable speed electrical power drive systems Part 2: General requirements - rating specifications for low voltage adjustable frequency A.C. power drive systems
SC22G / WG10	Revision of IEC 61491 Electrical equipment of industrial machines – Serial data link for real-time communications between controls and drives
SC22G / WG11	Development of 61800-8 Adjustable speed electrical power drive systems Part 8: Specification of voltage on the power interface
TC2 / MT9 (former SC22G/TC2 / WG26 (JWG)):	Guide for the design and the performance of cage induction motors for converter supply
SC22H / WG2:	IEC 62310-1, -2, -3 Static Transfer Systems
SC22H / MT3:	Maintenance Team for IEC 62040-2
SC22H / MT4:	Maintenance Team for IEC 62040-1-1 and IEC 62040-1-2

History

TC 22 was set up on 13th of October 1934 and its main task is to prepare international standards for systems, equipment and their components for power electronic conversion and electronic power switching.

SC 22 A “Mercury-Arc Converters”
Set up in 1937 as SC22-1, disbanded in 1970

SC 22 B “Semiconductor Converters”
Set up in 1954 as SC22-2, disbanded in 1999

SC 22 C “Ignitrons and Excitrons”
Set up in 1961, disbanded in 1970

SC 22 D "Electronic power converter for rolling stock"
Set up in 1962, disbanded in 1996, work transferred to TC 9

SC 22 E “Electronic stabilized power supplies”
Set up in 1966

SC 22 F “Power Electronics for Electrical Transmission and Distribution Systems”

Set up in 1970; took over the work of Preparatory Working Group 5 of TC 22 dealing with converters for high-voltage d.c. power transmission

SC 22 G “Adjustable speed electric drive systems incorporating semiconductor power converters”
Set up in 1979

SC 22 H “Uninterruptible Power Systems”
Set up in 1999, took over the work of SC 22 B/WG 2

Membership

	P-members	O-members
TC22	20	18
SC22E	19	16
SC22F	15	17
SC22G	22	14
SC22H	16	5

Country	**TC22**	**SC22E**	**SC22F**	**SC22G**	**SC22H**
Australia	O	O	O	P	P
Austria	O	O	P	O	O
Belgium	O	P	O	O	O
Bulgaria	O	O	O	O	-
Canada	O	P	O	P	P
China	P	P	P	P	P
Croatia	O	O	O	O	-
Czech Republic	O	O	O	O	O
Denmark	P	P	P	P	P
Finland	P	P	O	P	P
France	P	P	P	P	P
Germany	P	P	P	P	P
Hungary	P	O	O	O	-
India	O	O	P	O	-
Ireland	O	-	-	-	-
Italy	P	P	P	P	P
Japan	P	P	P	P	P
Korea (Republic of)	P	P	P	P	P
Malaysia	O	O	O	O	-
Mexico	P	P	-	P	-
Netherlands	O	O	O	O	O
New Zealand	P	O	O	P	-
Norway	P	O	O	P	-
Poland	O	O	O	O	O
Portugal	P	P	P	P	P
Romania	O	P	O	P	-
Russian Federation	P	P	P	P	-
Serbia	O	O	O	O	-
Singapore	O	O	O	O	-
South Africa	O	O	-	O	-
Spain	P	P	P	P	P
Sweden	P	P	P	P	P
Switzerland	P	P	P	P	-
Thailand	P	P	-	P	P
Turkey	O	-	-	-	-
Ukraine	O	O	O	O	-
United Kingdom	P	P	P	P	P
United States of America	P	-	-	P	P

System Approach Relevance

Committees which are customers of IEC SC22x (our product is part of their system) **C**
Committees that are suppliers to IEC SC22x (their product is part of our system) **S**
Other Committees (partner committees, committees providing generic guidance, etc.) **O**

Organization		TC22	SC22E	SC22F	SC22G	SC22H
IEC TC1	Terminology	O	O	O		
IEC TC2	Rotating machines	O			O	
IEC TC3	Information structures, documentation and graphical symbols	O				
IEC TC7	Overhead electrical conductors			S		
IEC TC8	Systems aspects for elec. Energy supply			C		C
IEC TC11	Overhead lines			S		
IEC TC14	Power transformers			S	O	
IEC SC17A	High-voltage switchgear and controlgear			S	S	
IEC SC17B	Low-voltage switchgear and controlgear				S	S
IEC SC17C	High-voltage switchgear and controlgear assemblies			S	C	
IEC SC17D	Low-voltage switchgear and controlgear assemblies				C	
IEC TC20	Electric cables			S		S
IEC TC21	Secondary cells and batteries					S
IEC SC23B	Plugs, socket-outlets and switches					S
IEC TC28	Insulation co-ordination	O		O		
IEC TC31	Equipment for explosive atmospheres				C	
IEC TC32	Fuses				S	
IEC SC32B	Low-voltage fuses	S			S	S
IEC TC33	Power capacitors			S	S	S
IEC SC36A	Insulated bushings			S		
IEC SC36B	Insulators for overhead lines			S		
IEC SC36C	Insulators for substations			S		
IEC TC37	Surge arrestors			S		
IEC TC38	Instrument transformers			S		
IEC SC47E	Discrete semiconductor devices	S		S	S	S
IEC TC44	Safety of machinery - Electrotechnical aspects				C	
IEC TC48	Electromechanical components					S
IEC TC57	Power system management and associated information exchange			C		
IEC TC59	Performance of household electrical appliances				C	
IEC TC61	Safety of household and similar electrical appliances				C	
IEC TC62	Medical equipment					C
IEC SC62A	Common aspects of electrical equipment used in medical practice		C/S			
IEC TC64	Electrical Installations and protection against electric shock			O	C	O

IEC TC65	Industrial-process measurement, control and automation				O	
IEC TC66	Safety of measuring, control and laboratory equipment	O	C/S			
IEC TC69	Electric vehicles				C	
IEC TC70	Degrees of protection of enclosures	O			O	O
IEC TC73	Short circuit currents			O		
IEC TC77	Electromagnetic compatibility				O	O
IEC SC77A	Electromagnetic compatibility – Low frequency phenomena	O	O	O	O	O
IEC SC77B	Electromagnetic compatibility – High frequency phenomena		O	O		
IEC TC82	Solar PV energy systems	C				C
IEC TC88	Wind Turbines	C			C	
IEC TC91	Electronic assembly technology					S
IEC TC96	Transformers, reactors, power supply units and similar products for low voltage up to 1100 V		O			
IEC TC99	System engineering and erection of electrical power installations in systems with nominal voltages above 1kv a.c. and 1.5kV d.c., particularly concerning safety aspects	O		C	C	
IEC TC104	Environmental conditions, classification and methods of test	O		O	O	O
IEC TC105	Fuel cells	C				C
IEC TC108	Safety of IT / Communication		C/S			C
IEC TC109	Insulation coordination for low-voltage equipment				O	
IEC TC111	Environmental standardization for electrical and electronic products and systems	O		O	O	O
IEC TC112	Evaluation and qualification of electrical insulating materials and systems		O	O		
IEC TC114	Marine energy - Wave and tidal energy converters	C			C	
IEC CISPR	Electromagnetic Compatibility			O	O	O
ISO TC184	Industrial automation systems and integration (particularly SC1 – Physical device control)				C	
CIGRE SC B4	HVDC and power electronic equipment			S		
IEEE-PES (SC 10)	High-Voltage Power Electronics Stations Subcommittee			S		

Liaisons

TC22:	IEC/SC32B, IEC/SC47E, IEC/TC66, IEC/TC99
SC22E:	IEC/SC62A, IEC/TC66, IEC/SC77A, IEC/TC96, IEC/TC108, IEC/TC112
SC22F:	IEC/TC99, CIGRE SC B4 (A), CENELEC TC22X, IEEE-PES 10 (D), IEC/TC33
SC22G:	IEC/TC2, IEC/SC17B, IEC/32B, new IEC/SC65C, IEC/SC77A, IEC/TC99
SC22H:	IEC/SC17B, new IEC/TC21, IEC/SC32B, IEC/SC77A, IEC/TC108, IEC/TC82

B. Environment

B.1 Business environment

With the continuing growth of the standard of living and the economy, the use of electric energy is increasing worldwide. Urbanization, alternative energy sources, and the trend towards unbundling and privatization of power systems in many countries require new concepts for power conversion, transmission and distribution. Means are being sought for more efficient transmission, distribution, and application of electric energy in industry and in the private sector. There are increasing legislative and political demands for improvement of system and process efficiency, which leads to increased use of power electronics. This particularly includes fast control of power flow, power quality, motion control, and transportation applications. In all cases, applying power electronics is the method of choice to arrive at economic solutions. The TC is supporting but not driving these external trends. With the increased integration of power electronics into various applications and products, there is a tendency that differing standards are developed for the same product in various applications and in various countries, whereas it is desirable from the economic point-of-view that like equipment is built according to the same standards worldwide.

B.2 Market demand

There is a market demand for standards in the field of terminology, specification, and testing of power electronic equipment and systems. An increased need for standardization is also noted regarding safety, EMC, environmental considerations and system power losses.
There are generic standards which are already available in the IEC 60146 series of standards. They are used by all designers of power electronic circuits and by academia. These horizontal standards are in the responsibility of the main committee. In the near future, only maintenance work is necessary on these standards. However, the participation for standardization work has to be improved.
The demand for product standards develops with the technical progress and the globalization of the business. An increased demand for systems standards can also be noted, due to the growth of use of complex systems in industry. The development is driven by manufacturers and customers of the products, in many cases still on a national or regional level.
Within TC22, the product standards are mainly in the responsibility of the SC's. The participation of interested bodies is good. The product standards incorporate also all other horizontal standards of IEC. With minor exceptions in the field of power supplies, there is no competition with other IEC standardization bodies, however in some countries and regions there are competing local standards.
The market asks for increased user-friendliness of the standards. This market demand has especially to be taken into account during the scheduled maintenance cycles.

B.3 Trends in technology and trade

Due to the advances in semiconductor technology and the increasing demand for fast power flow control and energy saving, fast controlled power electronics will continue to find new applications. This results in an improvement of methods for power transmission and distribution as well as for power conversion.
Power electronics is considered as a horizontal function in many technical applications. Power electronics is developing fast with respect to the number of applications where power electronics become an integral part, e.g. in the fast growing market of distributed power generation.
New semiconductor devices and advanced micro-electronics with added features are being developed and result in new circuits being designed to make full use of their capabilities supporting the spread into new applications.
Regarding fundamental topologies of circuits as well as environment properties, the speed of development is rather slow.

Users and manufacturers increasingly prefer products made to worldwide harmonized standards. This trend should be supported by the standard development.

B.4 Ecological environment

In general, power electronics have a huge potential to affect the ecological systems in a positive way.
The advantage of power saving because of power electronics is supporting many initiatives of environment protection.

Power electronics is the enabling technology for the utilization of regenerative energy sources and for the introduction of decentralized energy production. Examples are solar power, wind power, microturbines and fuel cells.
The life cycle aspect of power electronic products and components is covered adequately by ISO 14000.
It is noted that requirements concerning the use of certain materials will impact the design, manufacture and disposal of power electronic equipment.

C. Work programme

Current work

The current work includes the maintenance of generic and product standards and development of new product standards.
For maintenance of standards, TC22 and its subcommittees formed several Maintenance Groups.
An essential part of the current work is to supplement existing product standards by provisions for safety and EMC requirements.

Work Program
TC22
2009-11 in Tokyo (Japan)

SC22E
2009-11 in Tokyo (Japan)
2010-10 with IEC General Meeting in Seattle (U.S.A.)

SC22F
2008-10 in China
2009-11 in Tokyo (Japan)

SC22G
2009-11 in Tokyo (Japan)

SC22H
2009-11 in Tokyo (Japan)

C.2 Resources/infrastructure needed

The recruitment of experts is increasingly difficult, as the cost cutting with manufacturers, users, and academia continues. The use of electronic communication within the development process of a standard has become most important. This is supported by the IEC Central Office through efficient tools and training means to learn their use.

D. Future work

New possible fields are:
- Activities on power electronics used for solar photovoltaic energy systems in cooperation with TC 82
- Activities on power electronics used for fuel cells in cooperation with TC 105.
- Standards on converters being part of distributed power generation units with the function of connecting them to the grid.

If and when any of these new activities is required by the market, this is expected to result in a new SC within TC22. Such a new SC will need additional experts from the application side.

Future work of SC 22F
Revision of IEC 60919-3, Ed. 1 (Technical Specification) "Performance of high-voltage direct current (HVDC) systems - Part 3: Dynamic conditions".
IEC 62344 Ed. 1.0EANW General guidelines for the design of ground electrodes for high-voltage direct current (HVDC) links
IEC/PAS 62543 Ed. 1.0EAMW High-voltage direct current (HVDC) transmission using voltage sourced converters (VSC) (NPPAS)

IEC/PAS 62544 Ed. 1.0EAMW Active filters in high-voltage direct current (HVDC) applications (NPPAS)

SC22G shall also be prepared to take care of any new related technology. An example is given by the so called “integrated motors”. SC22G is open to any kind of cooperation with any relevant TC or SC to deal jointly with such items.

SC22H: Set up of an ad hoc group to investigate the scope and content of a possible environmental standard dedicated to UPS and STS.

E. Maintenance cycle

Publication no.	Date of publication	Review date	Maintenance result date	Responsibility (Maintenance Team)
TC 22				
IEC 61148 Ed. 1.0	1991	2009	2011	TC22 MT3
IEC 60146-1-1 Ed. 3.0	1996	2003	2009	TC22 MT3
IEC 60146-1-1 Amd.1 Ed. 3.0	1996	2003	2009	TC22 MT3
IEC 60146-1-2 TR0 Ed. 3.0	1991	2009	2011	TC22 MT3
IEC 60146-1-3 Ed. 3.0	1991	2009	2011	TC22 MT3
IEC 60146-2 Ed. 2.0	1999	2009	2011	TC22 MT3
IEC 60146-6 TR2 Ed. 1.0	1992	2011	2011	TC22 MT3
IEC 62103	2003	2009	2009	TC22 MT4
SC 22E				
IEC 61204 Amd.1 Ed. 1.0	2001-01	2011	2014	SC22E MT2
IEC 61204 Ed. 1.1	2001-05	2011	2014	SC22E MT2
IEC 61204-3 Ed. 1.0	2000-11	2005	2007-11	SC22E MT5
IEC 61204-6 Ed. 1.0	2000-11	2011	2014	SC22E MT6
IEC 61204-7	2005	2008	2011	SC22E MT7
SC 22F				
IEC 60633, Ed. 2	1998-12	2007-02	2009-12	MT 13
IEC 60700-1, Ed. 1, Am.1	2003-02	2006-10	2008-12	MT 9
IEC/TR 60919-1, Ed. 2.0	2005-03	2007-07	2009-06	MT 11
IEC/TR 60919-2, Ed. 1	1990-10	2007-06	2008-12	MT 11
IEC/TS 60919-3, Ed. 1	1998-12	2007-07	2009-06	MT 11
IEC 61803, Ed. 1	1999-02	2008-08	2011-01	MT 14
IEC 61954, Ed. 1, Am.1	2003-04	2007-12	2010-04	MT 10
IEC/PAS 61975	2004-08		2009-09	
IEC/PAS 62001	2004-07		2009-07	
IEC/PAS 62344	2007-05		2010-05	
SC 22G				
IEC 61491 Ed. 2.0	2003	2007	2009	SC22G MT
IEC 61800-1 Ed. 1.0	1997	2009	2010	SC22G MT
IEC 61800-2 Ed. 1.0	1998	2008	2010	SC22G MT9
IEC 61800-3 Ed. 2.0	2004	2007	2010	SC22G MT7
IEC 61800-4 Ed. 1.0	2002	2009	2010	SC22G MT12
IEC 61800-5-1 Ed. 2.0	2007	2009	2012	SC22G MT11
IEC 61800-5-2 Ed. 1.0	2007	2009	2012	SC22G MT6
IEC 61800-6 Ed. 1.0	2002	2008	2010	SC22G MT8
IEC 61800-7-1 Ed. 1.0	2007	2010	2013	SC22G MT10
IEC 61800-7-200 Ed. 1.0	2007	2010	2013	SC22G MT10
IEC 61800-7-300 Ed. 1.0	2007	2010	2013	SC22G MT10
SC 22H				
IEC 62040-1-1	2002-08	2005-03	2008-02	MT4
IEC 62040-1-2	2002-08	2005-03	2008-02	MT4
IEC 62040-2 Ed. 2.0	2005-10	2009-05	2011-05	MT6

IEC 62040-3 Ed. 1.0	1999-03	2008-02	2010-12	MT5
IEC 62310-1	2005-05	2009-10	2011-10	MT
IEC 62310-2	2006-01	2009-10	2011-10	MT

Name or signature of the secretary
Dr. Jürgen K. Steinke