



IEC 62368-1 Certified Power Supplies



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Synopsis

The IEC 62368-1 draft standard defines a new set of safety requirements for certain types of electronic equipment. This paper outlines the scope and characteristics of IEC 62368-1 and examines the place of the new standard in the market. It then analyzes design concerns that will pose certification challenges once the new standard is enforced and explores aspects of compliance that can be addressed now. Finally, it outlines a path manufacturers and systems integrators can take toward eventual certification under the new standard.

Introduction

IEC 62368-1 is a recent draft standard that has been published by the International Electromechanical Commission (IEC), an international regulatory body that develops “international standards and conformity assessment for all electrical, electronic and related technologies.” The IEC 62368-1 design standard was created to increase the safety of electronic devices through two processes:

1. Defining and standardizing the safety characteristics of these devices
2. Creating a compliance certification program to ensure implementation

Scope

The purpose of IEC 62368-1 is to update, consolidate and standardize the safety requirements of Information Technology, Communications Technology, and Audio/Visual equipment and related types of electronic devices. The scope of IEC 62368-1 is to apply a set of hazard-based, performance-oriented safety standards that will replace the previous IEC 60950-1 and IEC 60065 standards. The new specification is also technology independent.

Per the IEC’s 2014 Abstract

- IEC 62368-1:2014 deals with the safety of electrical and electronic equipment within the field of audio, video, information and communication technology, and business and office machines with a rated voltage not exceeding 600 V.
- This standard does not include requirements for performance or functional characteristics of equipment.
- A rated voltage of 600 V is considered to include equipment rated at 400/690 V.
- This part of IEC 62368 is also applicable to: components and subassemblies intended for incorporation in this equipment. Such components and subassemblies need not comply with every requirement of the standard, provided that the complete equipment, incorporating such components and subassemblies, does comply; external power supply units intended to supply other equipment within the scope of this part of IEC 62368 and accessories intended to be used with equipment within the scope of this part of IEC 62368.

Where it will apply

IEC 62368-1 is an international standard that will be applied globally. It is expected that individual countries will adopt their own precise specifications that draw upon the international standard with specific rules in place to adapt to local voltage and electrical conditions. Several countries in Europe and North America have already committed to IEC 62368-1. This standard provides greater uniformity across regional and national markets than previous standards to encourage standardization across different geographies and

minimize the differences between devices designed for use in one country from those used in other countries.

Localization

IEC 62368-1 is a generalized standard that sets a series of guidelines and parameters for the design characteristics of electromechanical devices. Since devices in different regions and countries will be expected to operate in different electrical and environmental conditions, national and regional certification bodies will also develop region-specific and nation-specific extensions to these standards, which will be based on the core standard of 62368-1 but allow for localized variances in voltages and other concerns related to local power sources and their specific characteristics.

The concern and the goal is to create a specification that offers the greatest possible level of standardization through a broad international specification, yet allow for localized variances that will allow the core products developed under this specification to be implemented in a variety of operating environments with as little customization and change as is possible.

Timing of the New Specification

As of this writing, the new standard is still evolving. The last published version of IEC62368-1 dates from 2013, and the final standard is scheduled to be finalized and implemented beginning in 2019.

Certification

IEC 62368-1 is written as a standard, and certification will include rigorous testing for compliance. The IEC or its designees will develop and publish testing guidelines, and each product will have to pass a series of compliance tests before being approved. Manufacturers will have to prove compliance to the new safety standard in order to continue selling their products into the markets that adopt the standard.

Non-Compliance

As of this writing, the IEC has made no provisions for continuing to allow the shipment of non-compliant systems. Companies that fail to produce a compliant design by the deadline could be prevented from even shipping their products, so the cost of non-compliance could become very high once the spec is formally adopted in major market countries. With the risk of non-compliance prohibitively high, many companies are already working toward IEC 62368-1 compliance with the belief that it's never too soon to start building compliance into your product designs.

Current Outcomes

With the final spec still over 3 years from implementation, designers, developers and integrators may be tempted to delay their work towards seeking compliance. But integrators who think they have ample time and wait to begin development of their IEC 62368-1-compliant designs are playing a dangerous game. The stakes of non-compliance can be very high and can even include being prevented from shipping non-compliant products once the standard is adopted. With this disproportionately high potential cost of non-compliance, it would be a mistake for most developers to wait before starting development of compliant solutions.

Gaining experience with IEC 62368-1

With the draft spec already published, manufacturers already have an opportunity to start gaining experience with IEC 62368-1. Ideally, smart companies will start building compliant designs in their current design cycles, so any challenges associated to the certification process can be dealt with now, when failure wouldn't cause large financial impacts. Working within IEC 62368-1 specifications now gives your design teams multiple product lifecycle iterations to flush out design challenges and overcome engineering

teams multiple product lifecycle iterations to flush out design challenges and overcome engineering difficulties that could delay compliance once the spec is implemented and regulated. If your design teams can meet the new requirements of IEC62368 now, you can ensure your product is ready for compliance certification and will be available for early adopters.

For the average manufacturer of electronic subsystems, compliance with IEC 62368-1 can mean compliance of their specific subsystems. For integrators of consumer-facing systems, compliance must cover an entire system, from the internal design to the use of connectors, power supplies and packaging. The spec makes it clear that compliance is only critical at the systems level, but the best way to ensure compliance at the system level is to utilize specification-complaint components whenever possible in your designs.

Design Goals

What is important for today? What goals should developers be striving to meet in the current regulatory environment?

1. Prepare to be early to market with IEC 62368-1-compliant devices when the spec is rolled out for public implementation.
2. Gain experience with developing hardware that will meet the requirements of IEC 62368-1.
3. Develop core subsystems that can be ported from one IEC 62368-1 compliant device to another when building families of electromechanical devices for different applications.
4. Develop core subsystems that can be ported from one IEC 62368-1 compliant device to another when building otherwise identical electromechanical devices intended for different markets with different electrical grid and connector characteristics.

As you can see from this list, there will need to be a disproportionate amount of scrutiny placed on the electrical aspects of this specification. IEC62368 offers another departure from previous standards in that it is written as a hazard-based standard:

The Prescriptive Tradition

Previous standards methodologies relied upon a prescriptive set of rules and guidelines to ensure compliance. Following all the rules of the specification ensured that a product would be compliant, but it didn't necessarily ensure that the design would be as safe as it possibly could be. If there were errors or omissions in the standard, or if technology changes rendered portions of the standard out of date, a fully-compliant product could still offer a considerable hazard.

Moving to a Hazard-Based Standard

IEC 62368-1 is considered a hazard-based standard, which means that the standard strives to identify and eliminate hazards as part of the design and development process. Unlike previous standards, which primarily relied on a set of rules and protocols to enhance safety, IEC 62368's hazard-based philosophy means that designers and developers are given greater latitude for seeking a safer, less hazardous product design at every stage in the development process.

Ambiguity

The absence of a prescriptive standard offers the greatest flexibility for novel and creative solutions, but it can also complicate development for your own designs and for the designers of the subsystems you'll use. How can you be sure that the suppliers you choose to work with will be able to handle the rigor of meeting the requirements of the new specification? One way is to work with subsystems that already meet the spec themselves.

The Worst Case Scenario

For any designer or developer, the worst case scenario would be to have a product design that simply can't become certified. And whether that's due to a lack of planning, an inability to overcome unforeseen design challenges, or a surprising limitation in the products you get from one of your suppliers, this is an outcome to avoid if at all possible.

Where to Start?

For any electronics safety standard, the handling of electrical input currents is one of the most hazardous aspect of their design. Electrical current can lead to heat, radiation, and even fire when not handled properly. So the selection of a safety-compliant and specification-compliant power supply is critical to the implementation of any compliant design.

At the very least, your design teams should specify alternative components for critical subsystems like power supplies now. That way even an inability or unwillingness to become compliant on the part of one of your suppliers will not prevent you from shipping a compliant product and meeting your customers' needs.

Power Supplies Already Compliant

Fortunately, when it comes to power supplies, there are already compliant designs available for testing, integrations and production volume manufacturing. Power supply manufacturers have identified the importance of IEC 62368-1 and are already making products that are compliant with the IEC 62368-1 standard in 2016. For any design that will require certification under IEC 62368-1 or any systems integrator that wishes to confirm their subsystems are compliant now, these compliant designs offer the most reliable and cost effective way to address the requirement for a dedicated power supply without requiring original design and manufacturing work on the part of the integrator.

Manufacturers including Globtek, Inc. have released IEC 62368-1 compliant power supplies in a number of formats ranging from 6-10 Watts and incorporating open frame, internal, and external form factors to adapt to a variety of power applications.

Conclusions:

Despite the challenges associated with gaining compliance to IEC 62368-1, manufacturers still have some time to design in compliance to this new specification. With non-compliance a non-option for most applications, it is important to position your company's design portfolio to be as robust and compliant as possible. There is sufficient support in the market to start this process now, in order to gain experience through the maximum number of design cycles possible. Critical subcomponents, including power supplies, can be obtained with their own certified compliance to the spec. The use of pre-certified subassemblies may offer the most cost-effective way for any manufacturers to navigate the design process to launch compliant products.

IEC 62368-1 Certified Power Supplies

Name	Type	Input Voltage	Watts	Vout	Efficiency	Ingress Protection	MOOP	MOPP	60601-1-4th Ed.	Dimensions (mm)
GT-96180-18VV-T3-SP	Desktop/ External	100-240V~, 50-60 Hz	18	18-56 V	VI					107*55*36
GT-96180-1856-T2-AP	Wall Plug-in+Desktop Combination	100-240V~, 50-60 Hz	18	56 V	VI					107*55*36
GTM96180-18VV-T3A	Desktop/ External	100-240V~, 50-60 Hz	18	5-48 V	VI	IP42		☑	☑	(L)87x(W)47x(H)32mm
GTM96180-18VV-DW	Desktop/ External	100-240V~, 50-60 Hz	18	5-48 V	VI			☑	☑	
	Wall									

GT-96180-1856-R3A-AP	Plug-in+Desktop or Combination	100-240V~, 50-60 Hz	18	56 V	VI	Indoor Use				
GT-96180-18VV-T3A-SP	Desktop/ External	100-240V~, 50-60 Hz	18	18-56 V	VI					107*55*36
GTM96180-18VV-T2A	Desktop/ External	100-240V~, 50-60 Hz	18	5-48 V	VI	IP42		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(L)87x(W)47x(H)32mm
GTM96180-18VV-T2	Desktop/ External	100-240V~, 50-60 Hz	18	5-48 V	VI	IP42		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(L)87x(W)47x(H)32mm
GT-96180-18VV-T2-SP	Desktop/ External	100-240V~, 50-60 Hz	18	18-56 V	VI					107*55*36
GT-96180-18VV-T3A-PP	Desktop/ External	100-240V~, 50-60 Hz	18	18-56 V	VI					107*55*36
GT-96180-18VV-R2-PP	Wall Plug-in+Desktop or Combination	100-240V~, 50-60 Hz	18	18-56 V	VI					
GTM96180-18VV H/M	Wall Plug-in	100-240V~, 50-60 Hz	18	4-48 V	VI	IP42		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	74*43.5*36.8
GTM96180-18VV-T3	Desktop/ External	100-240V~, 50-60 Hz	18	5-48 V	VI	IP42		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(L)87x(W)47x(H)32mm
GT-96180-1856-R2-AP	Wall Plug-in+Desktop or Combination	100-240V~, 50-60 Hz	18	56 V	VI	Indoor Use				
GT-96180-WWWV-T3-PP	Desktop/ External	100-240V~, 50-60 Hz	18	18-56 V	VI					
GT-96180-1856-T3-AP	Desktop/ External	100-240V~, 50-60 Hz	18	54-56 V	VI					
GT-96180-18VV-T2-PP	Desktop/ External	100-240V~, 50-60 Hz	18	18-56 V	VI					107*55*36
GT-96180-1856-T3A-AP	Desktop/ External	100-240V~, 50-60 Hz	18	56 V	VI					107*55*36

GT-96300-36VV-T2-SP	Desktop/External	100-240V~, 50-60 Hz	36	18-56 V	VI	IP40				107*55*36
GT-96300-3656-T3A-AP	Desktop/External	100-240V~, 50-60 Hz	36	0 V	VI	IP40				107*55*36
GT-96300-36VV-T3A-PP	Desktop/External	100-240V~, 50-60 Hz	36	18-56 V	VI	IP40				107*55*36
GT-96300-36VV-T3-SP	Desktop/External	100-240V~, 50-60 Hz	36	18-56 V	VI					107*55*36
GT-96300-36VV-T2-PP	Desktop/External	100-240V~, 50-60 Hz	36	18-56 V	VI	IP40				107*55*36
GT-96300-36VV-T3A-SP	Desktop/External	100-240V~, 50-60 Hz	36	18-56 V	VI					107*55*36
GTM96300-36VV-T2A	Desktop/External	100-240V~, 50-60 Hz	36	5-48 V	VI	IP42, IP54 Option available	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		(L)105.0x(W)50.0x(H)35.50mm
GT-96300-36VV-R2-PP	Wall Plug-in+Desktop Combination	100-240V~, 50-60 Hz	36	18-56 V	VI	IP40				107*55*36
GT-96300-36VV-T3-PP	Desktop/External	100-240V~, 50-60 Hz	36	18-56 V	VI	IP40				107*55*36
GT-96300-36VV-R3A-PP	Wall Plug-in+Desktop Combination	100-240V~, 50-60 Hz	36	18-56 V	VI	IP40				107*55*36
GTM96300-36VV-T2	Desktop/External	100-240V~, 50-60 Hz	36	5-48 V	VI	IP42, IP54 Option available	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		(L)105.0x(W)50.0x(H)35.50mm
GTM96300-36VV-T3A	Desktop/External	100-240V~, 50-60 Hz	36	5-48 V	VI	IP42, IP54 Option available	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		(L)107.2x(W)50.0x(H)35.0
GT-96300-3656-T2-AP (Desktop, non Hybrid)	Desktop/External	100-240V~, 50-60 Hz	36	56 V	VI	IP40				107*55*36
GT-96300-3656-R2-PP	Wall Plug-in+Desktop	100-240V~, 50-60 Hz	36	0 V	VI	IP40				107*55*36

AP	op Combin ation	50-60 Hz								
GT-96300-3656-R3A-AP	Wall Plug-in+Desktop op Combin ation	100-240V~, 50-60 Hz	36	56 V	VI	IP40				107*55*36
GTM96300-36VV-R2	Wall Plug-in+Desktop op Combin ation	100-240V~, 50-60 Hz	36	5-48 V	VI	IP52, IP54 Option available		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(L)101.73x(W)46.47x(H)38.2 mm
GTM96300-36VV-R3A	Wall Plug-in+Desktop op Combin ation	100-240V~, 50-60 Hz	36	5-48 V	VI	IP52, IP54 Option available		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(L)101.7x(W)46.47x(H)38.2mm
GT-96300-3656-T3-AP	Desktop/ External	100-240V~, 50-60 Hz	36	56 V	VI	IP40				107*55*36
GTM96300-36VV-T3	Desktop/ External	100-240V~, 50-60 Hz	36	5-48 V	VI	IP42, IP54 Option available		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	105x(W)50.0x(H)35.0mm
GTM46402-40VV-x.x-Q	Wall Plug-in	100-240V~, 50-60 Hz	40	12-48 V	VI	Indoor Use		<input checked="" type="checkbox"/>		43.5 x 74.0 x 35.3
GT-43007-40VV-Q	Wall Plug-in	100-240V~, 50-60 Hz	40	12-48 V	V	IP52				43.5 x 74.0 x 35.3
GT-43007-40VV-Q(-40Deg)	Wall Plug-in	100-240V~, 50-60 Hz	40	12-48 V	V	IP52				
GTM43007-BWWWV-F	Open Frame/Internal	100-240V~, 50-60 Hz	60	5-48 V	N/A	N/A		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	101.6x50.8x23.6 for 5V-14V models, 101.6x50.8x22.5 for 15V-48V models
GTM43007-CWWWV-FW	Open Frame/Internal	100-240V~, 50-60 Hz	60	5-48 V	N/A	N/A		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	127x76.2x23.6
GTM43007-BWWWV-FW	Open Frame/Internal	100-240V~, 50-60Hz	60	5-48 V	N/A	N/A		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	101.6x50.8x23.6 for 5V-14V models, 101.6x50.8x22.5 for 15V-48V models
GTM43007-CWWWV-FW	Open Frame/Internal	100-240V~, 50-60 Hz	60	5-48 V	N/A	N/A		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	127x76.2x23.6

Model	Frame/Internal	Input Voltage/Frequency	Output Voltage	Output Power	Input Voltage Range	Input Frequency Range	Efficiency	Power Factor	Dimensions (mm)
GTM43007-BWVV-F	Open Frame/Internal	100-240V~, 50-60Hz	60	5-48 V	N/A	N/A	✓	✓	101.6x50.8x23.6 for 5V-14V models, 101.6x50.8x22.5 for 15V-48V models
GTM43007-AWVV-F (D3 without standoffs)	Open Frame/Internal	100-240V~, 50-60 Hz	60	5-48 V	N/A	N/A	✓	✓	76.2x50.8x23.6 for 5V-14V models, 76.2x50.8x22.5 for 15V-48V models Top Diagram i
GTM43007-AWVV-FW (D2 with standoffs)	Open Frame/Internal	100-240V~, 50-60 Hz	60	5-48 V	N/A	N/A	✓	✓	76.2x50.8x23.6 for 5V-14V models, 76.2x50.8x22.5 for 15V-48V models
GTM43007-AWVV-FW (D2 without standoffs)	Open Frame/Internal	100-240V~, 50-60 Hz	60	5-48 V	N/A	N/A	✓	✓	76.2x50.8x23.6 for 5V-14V models, 76.2x50.8x22.5 for 15V-48V models
GTM43007-AWVV-F (D3 with standoffs)	Open Frame/Internal	100-240V~, 50-60 Hz	60	5-48 V	N/A	N/A	✓	✓	76.2x50.8x23.6 for 5V-14V models, 76.2x50.8x22.5 for 15V-48V models Top Diagram i
GTM43007-AWVV-F	Open Frame/Internal	100-240V~, 50-60 Hz	60	5-48 V	N/A	N/A	✓	✓	76.2x50.8x23.6 for 5V-14V models, 76.2x50.8x22.5 for 15V-48V models Top Diagram i
GTM43007-AWVV-FW	Open Frame/Internal	100-240V~, 50-60 Hz	60	5-48 V	N/A	N/A	✓	✓	76.2x50.8x23.6 for 5V-14V models, 76.2x50.8x22.5 for 15V-48V models
GTM96900 P90VV-T3	Desktop/External	100-240V~, 50-60Hz	90	12-54 V	VI	IP41	✓	✓	149.3 x 62.8 x 34.0 +/-1.0
GTM96900 P90VV-T2	Desktop/External	100-240V~, 50-60 Hz	90	12-54 V	VI	IP41	✓	✓	149.38 x 62.6 x 33.5 +/-1.0 mm

Model	Form Factor	Input Voltage/Hz	Power (W)	Output Voltage (V)	Output Current (A)	Efficiency (%)	IP Rating	EMC Class	Safety Class	Dimensions (mm)
GTM96900 P90VV.V- T3A	Desktop/ External	100- 240V~, 50-60Hz	90	12-54 V	VI		IP41	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	149.38 x 62.6 x 33.5 +/-1.0 mm
GTM96120 0P120VV.V -T3	Desktop/ External	100- 240V~, 50-60 Hz	120	12-54 V	VI		IP41	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	149.30*62.80* 34.00
GTM96120 0P120VV.V -T2	Desktop/ External	100- 240V~, 50-60 Hz	120	12-54 V	VI		IP41	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	149.30*62.80* 34.00

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