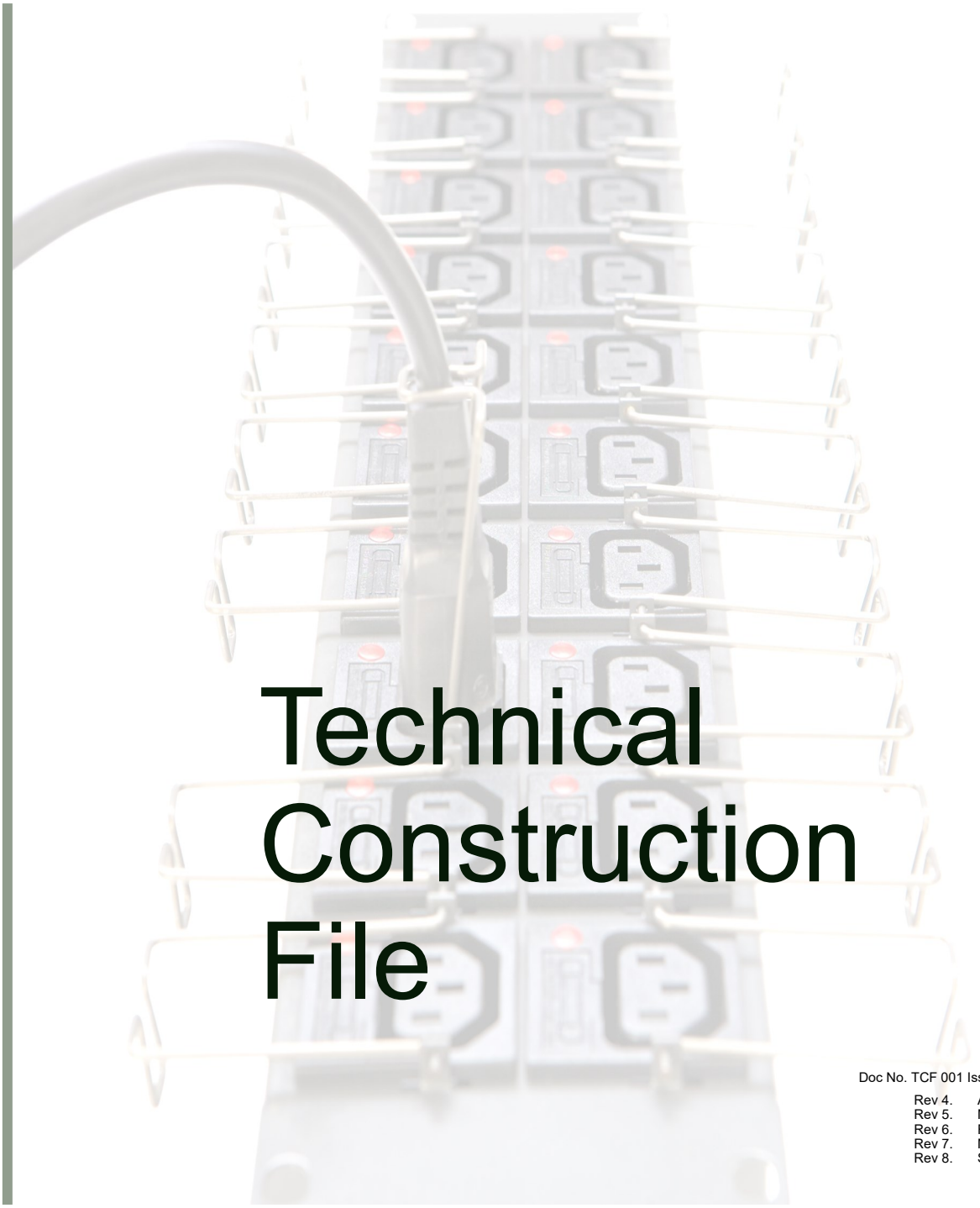
POWER G4

G4 M.P.S. Limited

Power Distribution Units



Technical Construction File

Doc No. TCF 001 Issue 1 2004

Rev 4. April 2008
Rev 5. May 2013
Rev 6. Feb 2015
Rev 7. May 2019
Rev 8. Sept 2023

Table of Contents

Introduction.	**About this document**	**P3**
	General	
	BS EN 62368	
	BS EN 6396	
About Us.	General	**P4**
	SI1994/3260	
	ISO 9001	
	Customer Variations	
Chapter 1.	**Technical Specifications**	**P5**
	General	
	Isolators	
	Input Cables	
	Protection	
	Transient & RFI Suppression	
	BS EN 61643-11:2012	
Chapter 2.	**Construction Specifications**	**P6**
	EN 62368	
	EMC	
	CE & UKCA Marking	
	Construction Techniques	
	Inspection	
	Data Applications	
	Low Voltage Directive	
	Data Wiring	
	Current Ratings	
	Labels	
	Earthing	
Chapter 3.	**Test Specifications**	**P8**
	General	
	Earth Bond Test	
	Insulation Test	
	Flash Test	
	Load/Fuse Check	
	Continuity Check	
	Function/Phase Test	
	Data Module Test	
Chapter 4.	**Material Specifications**	**P9**
	BSI Approved Materials List	
	Flame Retardancy	
	Customer Variations	
	RoSH Declaration	
	REACH Declaration	
	CE Declaration	

G4 Power Products are manufactured in England by:

G4 M.P.S. Limited.

Unit 16 Orchard Farm Business Park,
Barcham, Soham, Cambs. UK. CB7 5TU

Tel: 00 44 (0)1353 723248. Fax: 00 44 (0)1353 723941

www.g4mps.co.uk. Email: sales@g4mps.co.uk

Introduction

About This Document

General This document is set out to demonstrate the conformance of G4 MPS products in accordance with The Electrical Equipment (Safety) Regulations 1994 and In particular to the relevant standards governing Information Technology equipment and Electrical installations in office furniture, Electrical equipment shall be safe & constructed in accordance with principles generally accepted within the member States as constituting good engineering practice in relation to safety matters and in particular shall be designed and constructed to ensure that it is safe when connected to the electricity supply system by providing a level of protection against electric shock which relies on a combination of insulation and the protective earth conductor contained within the electricity supply system or which achieves that level of protection by other means; and in conformity with the principal elements of the safety objectives for electrical equipment set out in Schedule 3 to these Regulations.

BS EN 62368 Passive units BS EN 62368 Information technology equipment. General requirements specifies requirements intended to reduce risks of fire, electric shock or injury for the operator and layman who may come into contact with the equipment and, where specifically stated, for a service person. This standard is intended to reduce such risks with respect to installed equipment, whether it consists of a system of interconnected units or independent units, subject to installing, operating and maintaining the equipment in the manner prescribed by the manufacturer. This standard is applicable to mains-powered or battery-powered information technology equipment, including electrical business equipment and associated equipment, with a rated voltage not exceeding 600 V.

This standard is also applicable to such information technology equipment:

- Designed for use as telecommunication terminal equipment and TELECOMMUNICATION NETWORK infrastructure equipment, regardless of the source of power;
- Designed and intended to be connected directly to, or used as infrastructure equipment in a CABLE DISTRIBUTION SYSTEM, regardless of the source of power;

BS 6396:2022 BS 6396:2022 Electrical systems in furniture and educational furniture. This specifies requirements for the safe provision and assembly of electrical power, data and telecommunications distribution systems in furniture, educational furniture and office screens. BS 6396 applies to single phase electrical power distribution systems operating at rated voltages up to 250v AC that are connected to the fixed wiring of the permanent installation of the building by a 13 A fused plug and socket outlet arrangement conforming to BS 1363.

About Us

G4 Modular Power Solutions

General G4 MPS manufacture power distribution products, designed to assist in supplying power to Information Technology rack cabinets, desks and other areas requiring power outlets. They are manufactured in the UK using multiple output connectors including standard BS 1363 outlets, IEC C13 or C19 outlets, or other UK and European approved electrical sockets. The outlets can be configured as a single circuit, or as branch circuits with protection devices to suit applications or customer specifications. Metering can be included to show voltage, current draw or other measurements to specific requirements.

Desking modules can be power only or power and data outlets fitted in a single housing for the effective distribution of services to the desk top or office furniture.

2014/35/EU All G4 MPS products are designed to meet the Electrical Equipment (Safety) Regulations 2016 (2014/35/EU)
and as such are manufactured from materials sourced from manufacturers and suppliers in accordance with BS EN IEC 62368-1:2020+A11:2020 Information technology equipment Safety General requirements.

ISO9001 The G4 MPS manufacturing facility operates to ensure consistent quality in both the design stage and production of all the products. Manufacturing is controlled by a documentation and process system set out to ISO 9001, ensuring full traceability of products and components. With over 25 years experience in providing power distribution systems to a wide range of customers, the management team are committed to supplying a cost effective, high quality product to the most demanding of time scales.

Customer Variations G4 MPS specify, design and manufacture products to suit prescribed environments, or alternatively, clients can specify their own bespoke design for manufacture. Customer specified or supplied designs will be entered into the G4 documentation system and produced to the same criteria as a G4 design.

Note. *Units manufactured to customers own specifications must conform to the standards and specifications laid out in this document.*

Chapter 1

PDU Technical Specifications

General The G4 MPS power distribution units consist of one or more mains outlet connectors connected together in parallel. These can be either a BS 1363 UK style 13A outlet, IEC 60320 C13 or C19 outlet, or when requested, any other UK, European or other approved electrical outlet.

Isolators Where applicable, the incoming supply is switched via a suitably sized isolator which has high inrush capabilities to prevent contact arcing under full load conditions. Styles of isolators that can be fitted include switches, thermal switches, Hydraulic Magnetic breaker, DIN standard MCB's.
Units are also fitted with a mains neon indicator to show power present.

Input cables Power into the units is by a flexible cable consisting of conductors with the appropriate cross sectional area for the rated load. This is securely attached to the body of the unit by a locking cable gland. Leads are supplied to standard or customer specified lengths and terminated with a suitable plug commensurate to the specified current rating of the product. Alternatively, any make of Bus Bar tap off lead can be fitted, over sheathed with armoured or plastic flexible conduit.

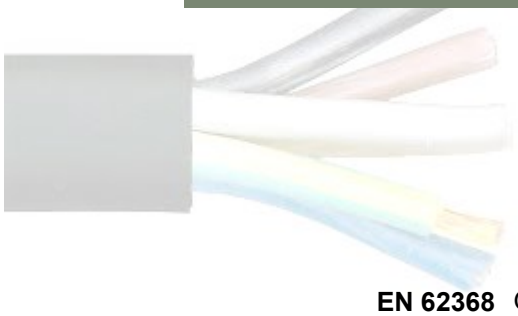
Protection Units may be fitted with an overall fuse or thermal breaker, or individual fuses per outlet. For personal protection against electric shock or burns, a 30mA trip level RCD or RCBO can be fitted.

Transient & RFI Suppression Units can be fitted with Transient Voltage Suppression circuitry, which also incorporates filtering to combat Radio Frequency Interference (RFI). Transient voltages are often referred to as "Spikes" or "Surges" and can be caused by the switching on or off of other electrical equipment. Another source of surges is nearby lightening activity, where surge voltages can typically reach in excess of 6Kv and current surges in excess of 3kA. The maximum protection provided under these conditions will depend on the position of the unit within a building.

BS EN 61643-21 Low-voltage surge protective devices. Surge protective devices connected to low-voltage power systems as fitted by G4 MPS will provide protection from mains born surges and Radio Frequency Interference, In accordance with BSEN 61643-1 Class 3 and BSEN 61643-11 Type 3.
Surge Suppression covers the requirement for live to neutral on input and output and also live to earth on output.

Maximum Working Voltage.	**275v**
Maximum Load current.	**16A (Option to upgrade to 32A)**
Line Frequency.	**50-60Hz**
Clamping Voltage.	**710v @10A**
Maximum Withstand Capability.	**1.75kA for 8/20µsec**
Transient Response Time.	**10ns**
RFI attenuation (Typ).	**-45db @ 1MHz**
Operating Temperature.	**-10ºc to +70ºc (Nominal)**

Chapter 2



Construction Specifications

EN 62368 G4 MPS mains distribution products have been designed to conform to the European Harmonisation document EN 62368. They are manufactured in accordance with BS 5733:2010+A1:2014.

EMC All products manufactured by G4 MPS are designed to comply with the EMC directive BS EN 12016 for emissions and intrusions where applicable. Typically, a PDU that contains only sockets with no additional control or monitoring circuitry is classed as a passive component of an active system and as such does not fall within the general scope of EMC testing.
All active PDU's conform to the relevant requirements for EMC conformity.

CE & UKCA Marking All products manufactured by G4 MPS are CE (UKCA) marked to show compliance with the relevant standards and directives pertaining to the products, for both UK and Europe

Construction Techniques All G4 MPS products are manufactured to high standards. Each build stage is treated as a sub assembly and as such subject to rigorous inspection. All wire assemblies are produced by semi-automatic machine which ensures consistency. Random checks are carried out for defects and correct formation and tested for mechanical integrity using a digital pull tester to 25Kg (Series 4, Model DPT 50, See BS EN 60352-8:2011.) The overall assembly techniques used guarantee a consistently high standard of manufacturing.

All units are fitted with an input lead consisting of conductors with the appropriate cross sectional area for the rated load. Where specified, units can be supplied without a lead for on site termination. In this case, a suitable rated connector block is fitted inside the unit for the cable to be connected to, thus avoiding unnecessary disturbance of the internal wiring.

Internal construction complies with BS 5733:2010+A1:2014. Units are rated at 16A as standard and 32A or 63A to order. Internal links are either soldered with 12swg or 14swg solid copper rod or made with 2.5mm, 4mm or 6mm Tri -Rated stranded cable and terminated with either a brass ferule or crimp receptacle. Where connectors have a screw down terminal, all wire connections will have a ferrule fitted to ensure an even loading when tightened down. All units are fully earth bonded with bases and lids linked by a suitably sized earth wire, secured to a 4mm earth stud.

Inspection The final stage in the construction cycle is a full visual inspection, prior to being sent for testing. On completion of the tests, the unit has a serial number and voltage & current ratings label attached before being cleaned and packed.

Chapter 2

Construction Specifications cont.

Data Applications Desking Modules can be fitted with shuttered data modules to either CAT5e or CAT6. Other connector styles can be incorporated if required.

Low Voltage Directive When units are fitted with data outlets, a metal segregation plate is fixed into the chassis to produce a separate enclosed area within the body of the unit to comply with the Low Voltage Directive. G4 MPS fit their own choice of data module. Alternatively, any make of industry standard 25x50mm or LJ6C sized can be specified.

Data Wiring Data cables can be fed into the units by way of a 21mm flexible plastic conduit, forming a protected umbilical, or as individual plain cables secured by a soft compression gland. This is normally at the opposite end to the power cable entry, or on the rear face of certain styles, although both the power and the data cables can enter from the same end to meet the requirements of specific applications.

Units containing data modules can be supplied with pre-terminated data cables and RJ 45 plugs, to specified lengths.
Responsibility of conformance with network cabling standards with regards to total cable length and the number of plug and socket connections in the Permanent Link resides with the customer.

Current Ratings All internal wiring is rated at either 16A as standard or 32A or 63A to order and made with 2.5mm (16A), or 4mm (32A) or 10mm (63A) Tri-Rated stranded cable.
To deliver 32A or 63A rating, the circuit is wired as a ring, with a link being taken from the furthest connection point, back to the start.

Labels All units are fitted with the G4 logo and a label stating voltage & maximum current rating and the CE mark, together with a unique serial number for traceability purposes.

Note.
The maximum current rating for each unit will be set by the maximum current rating of the input connector.

Earthing All units are fully earthed through the supply cable, which is attached to the unit by a crimped ring terminal secured to a 4mm welded earth stud. Where units have a separate metal lid, this has its own earth stud and is linked back to the stud on the chassis.

All units are manufactured with a M6 external Earth stud.

Chapter 3

Test Specifications

General All units have undergone a rigorous five stage test programme as specified by British Standards for Class 1 appliances. This is an automated test performed with a Portable Appliance Tester. In addition, each socket is checked for functionality.

Earth Bond Test The object of this test is to ensure that the connection between the earth or protective conductor of the mains supply plug makes contact with the earth pin on every outlet, as well as with the metal casing. Approximately 6v AC is passed down the earth pin of the input plug and a lead is connected to the furthest output socket. A current of 25A @.1w is applied for approximately 5 seconds to simulate full load conditions. The time limit of 5 seconds is to prevent damage by over stressing.

Insulation Test To test the effectiveness of the insulation, a nominal 500V DC is applied between the earth pin of the supply plug and the live and neutral pin which are automatically connected by the PAT Tester for the duration of the test. A resistance level not less than 1MΏ is measured to confirm sufficient insulation is present.

Load/Fuse Check A low voltage is applied to the unit to check if there is a load/fuse present.

Continuity check Each outlet is checked under load for cross connection between live & neutral to ensure correct fuse protection. (When fitted)

Function/Phase Test Each socket is tested for correct operation by inserting a Phase tester to show correct live and neutral phases. This also checks the socket for correct mechanical operation in terms of ease of fit and shutter function.

Data Module Wiring Where data modules are fitted and supplied with pre-terminated cables, an additional test is carried out using a line checker to ensure correct punch down terminations.

Chapter 4

Material Specifications

BSI Approvals All components used in the manufacture of G4 MPS products conform to the relevant British Standards Institute approvals or that of an equivalent recognised body.

Materials List The following list shows the key components used and the BSI specification number relevant to that component. Copies of specification documents are available from The British Standards Institute.

• 13A UK Socket outlets.	BS 1363
• IEC C13—C21 connectors.	IEC 60320
• Moulded cord sets and cables.	BS EN 50525
• Moulded plug top.	BS 1363
• MCB isolator.	BS EN 60898
• RCD isolator.	BS EN 61008
• RCBO isolator.	BS EN 61009
• Thermal Disconnect.	EN 60934
• Illuminated switch.	BS 61058
• Tri-rated equipment wire.	BS 6231

Flame Retardancy All components and plastic mouldings used throughout the products will conform to the International Flame Retardancy specifications. Full details are covered under the relevant manufacturers specification documents.

Customer Variations Units produced to customer specifications will be constructed to conform to the relevant standards. All components used will be to the required BS specifications.

RoHS Compliance The EU Directive 2002/95/EC for the Restriction of use of certain Hazardous Substances in electrical and electronic equipment and subsequent updates (RoHS) states that products should not contain prohibited lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) plus more.
G4 MPS have taken the necessary actions to ensure that these elements are not included in any of the components used in the manufacture of products.

REACH Compliance G4 MPS Ltd has concluded that our products can be considered as not requiring REACH registration for their intended use.

Declaration of Conformity

Directive (EU) 2015/863 of 31 March 2015 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances.

EC directive 2002/95/EC restricts the use of the hazardous substances listed below in electrical and electronic equipment. G4 Power has taken reasonable action to establish that the products we manufacture, namely:

Passive single and 3phs Power distribution units
Managed single and 3phs Power distribution units
Cable assemblies.

Are free from these substances, or in extreme cases, that the levels of these substances in these products do not exceed the permitted level and thus meets the requirements of the directive.

The substances and their permitted concentration levels are listed as follows.

Cadmium (Cd):	< 100 ppm
Lead (Pb):	< 1000 ppm
Mercury (Hg):	< 1000 ppm
Hexavalent Chromium (Cr VI):	< 1000 ppm
Polybrominated Biphenyls (PBB):	< 1000 ppm
Polybrominated Diphenyl Ethers (PBDE):	< 1000 ppm

On March 31, 2015, Directive 2015/863 added four additional substances to RoHS 2.
The restriction on use of these substances will go into effect on July 22, 2019 as RoHS 3.
These additional substances and their permitted limits are shown below.

Bis(2-Ethylhexyl) Phthalate	<1000ppm
Benzyl Butyl phthalate	<1000ppm
Dibutyl Phthalate	<1000ppm
Di isobutyl Phthalate	<1000ppm

On January 17, 2023, the European Chemicals Agency (ECHA) added a further nine substances to the Candidate List of substances of very high concern (SVHC).

1,1′- [ethane-1,2-diylbisoxy]bis[2,4,6-tribromobenzene]
2,2′, 6,6′-tetrabromo-4,4′-isopropylidenediphenol
4,4′- sulphonyl diphenol
Barium diboron tetraoxide
Bis (2-ethylhexyl) tetrabromophthalate covering any of the individual isomers and/or combinations thereof
Isobutyl 4-hydroxybenzoate
Melamine
Perfluoro heptanoic acid and its salts reaction mass of 2,2,3,3,5,5,6,6-octafluoro-4-(1,1,1,2,3,3,3-heptafluoropropan-2-yl)morpholine and 2,2,3,3,5,5,6,6-octafluoro-4-(heptafluoropropyl)morpholine

This inclusion expands the number of entries on the list from 224 to 233.

For and on behalf of G4 MPS Limited.

Managing Director.
May 5th 2023

RoHS (EU)/2015/863 COMPLIANT

G4 MPS Limited.
Unit 16 Orchard Farm Business Park, Barcham Road, Soham. Cambs. CB7 5TU. United Kingdom.

T: +44 (0)1353 723248 www.g4mps.co.uk info@g4mps.co.uk

Declaration of Conformity

Regulation (EC) No. 1907/2006 of the European Parliament and council on Registration, Evaluation and Authorisation of Chemicals (REACH) AMMD: 201 16/07/2019

G4 MPS Ltd. supports the goals of REACH (Registration, Evaluation, and Authorisation of Chemicals) which are consistent with our own commitment towards responsible use and handling of chemicals. The European Union passed new legislation on June 1, 2007 that oversees the registration, evaluation, and authorization of particular chemicals within the European Union community. REACH requires that all existing and new substances be registered with the European Chemicals Agency (ECHA).

After review of the legislation and most notably the definition of an “article” as defined in EC Regulation 1907/2006, Title II, Chapter 1, Article 7.1 (a) and (b), it is within the view of G4 MPS Ltd. that our products are considered “articles.” However, according to the definition in 7.1 (b), registration of an article is only required if it contains a named substance that “*is intended to be released under normal or reasonably foreseeable conditions of use*”

G4 MPS Ltd has concluded that our products can be considered as not requiring registration for their intended use.
Products sold by G4 MPS Ltd. do not contain any Substances of Very High Concern (SVHC) as defined in Article 33 (1) and (2) EC Title VII, Chapter 1 Article 57.

For and on behalf of G4 MPS Limited.

Managing Director.
18th September 2019

G4 MPS Limited.
Unit 16 Orchard Farm Business Park,
Barcham Road,
Soham.
Cambs. CB7 5TU.
United Kingdom.

T: +44 (0)1353 723248 www.g4mps.co.uk info@g4mps.co.uk

EC Declaration of Conformity

In accordance with BS EN ISO/IEC 17050-1:2010

We **G4 Modular Power Solutions Limited**

Of **Unit 16 Orchard Farm Business Park,**
Soham, Cambs, CB7 5TU, United Kingdom.

In accordance with the following Directive(s):

LVD 2014/35/EU

EMC Directive 2014/30/EUEN

of the European Parliament and of the Council of 26th February 2014 on the harmonisation of the laws of the member states relating to the making available on the market of electrical equipment designed for use within certain voltage limits.

Hereby declare that:

Equipment: **Power Distribution Units (PDU's)**

Model number(s): *Various as stated*

Is in conformity with the applicable requirements of the following documents:

Ref. No.	Title	Edition/date
BS EN 60950-1:2020	Information Technology equipment general safety requirements.	2020
BS 5733	General requirements for electrical accessories	2014

Referenced EMC Standards

BS EN 55016-2-3:2017+A2:2023 **BS EN 55020:2007+A12:2016** **EN 55022:2010** **IEC 60050-161**	**EN 60318-1:2009** **EN 61000-4-2:2009** **EN 61000-4-3:2006** **EN 61000-4-4:2012**	**EN 61000-4-5:2006** **EN 61000-4-6:2009** **EN 61000-4-8:2010** **EN 61000-4-11:2004**

and is also in conformity with Directive 2011/65/EU of the European Parliament and of the Council dated 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) for the reasons stated below:

A: Does not contain substances in excess of the maximum concentration values tolerated by Weight in homogenous materials as listed in Annex II of the Directive.

I hereby declare that the equipment named above has been designed to comply with the relevant sections of the above referenced specifications, and that the unit complies with all applicable Essential Requirements of the Directives.

Signed by:.....

Name: John Grover.

Position: Director.
Done at: G4 MPS Ltd, Soham, CB7 5TU
On: 10th March 2023

CE23