

## Isolated Power Supply (with SATS) SIPS-F-EDS-16



### Overview

Starkstrom has designed the Isolated Power Supplies to comply with the International and UK standards for areas that are classified as either “Group 2” or “Clinical Category 4 or 5” locations. These include BS: 7671 (17th Edition) Including Amendment No 3 (2015), HD 60364-7-710 - 2012, IET Guidance Note 7 (4th edition) and HTM06-01.

The standard Isolated Power System Type SIPS-F-EDS-16 consists of two distinct items:

- Floor-standing Monitoring and Distribution Panel
- Remote Alarm Annunciator (1-off) – choice of RA006, RA004, RA003 or RA008 (see separate data sheets)

The Floor-standing Distribution Panel includes:

2 off	Main Isolators
1 off	Starkstrom Automatic Transfer System - Advanced SATS
1 off	Medical isolation transformer
1 off	EDS400 Integrated Insulation Monitor and Automatic Earth Fault Detection System (EDS)
1 off	Webserver with TCP/IP functionality (standard network connection required)
4 off	Volt free inputs
1 off	Load current transformer
16 off	20A “B type” DP Miniature Circuit Breakers (MCB) - expandable up to 96*
16 off	Circuit identification current transformers - expandable up to 96*
1 off	Terminals for Alarm Annunciator & field wiring
1 off	Equipotential Earth Bar
1 off	Thermostatically controlled ventilation fan
1 off	Ventilation filter

\* May require an increase in panel dimensions or multiple panels

### Options

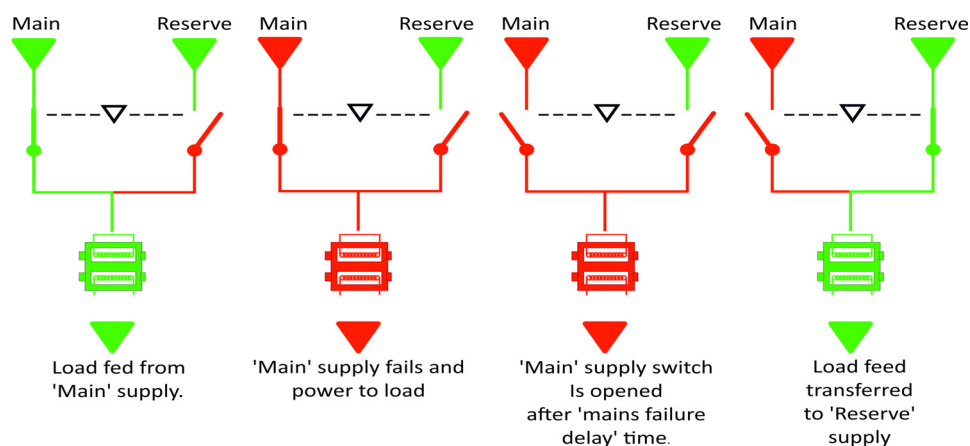
- IPS Controller type - IPM400 instead of EDS400
- MCB Trip Monitoring module (MTMM) - recommended
- Surge protection - recommended
- Transformer in-rush limiter
- Kilowatt hour meter (BREEAM)

## Starkstrom Automatic Transfer System (SATS)

Auto Transfer Systems are used extensively wherever there is a need for high availability of the power supply. They may be used to feed Isolated Power Supplies (IPS), with or without UPS backup.

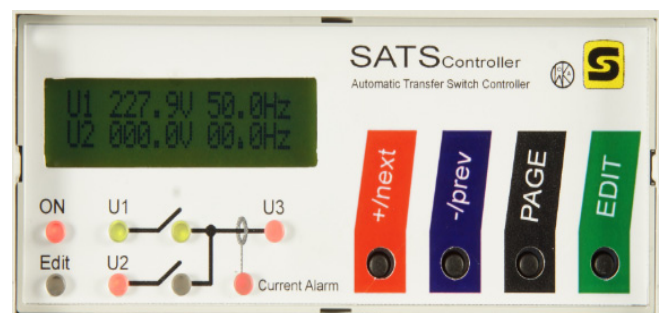
International and UK standards require a safety power supply source, with a changeover time of less than 0.5s, to be available in group 2 or clinical risk category 4 or 5 medical locations. This can be achieved through the use of a Starkstrom Automatic Transfer System (SATS).

The Auto Transfer System automatically switches a load on to a reserve or backup supply, in the event that the main supply fails below 90% of the nominal voltage.



### Benefits

- Where a UPS is not installed with the IPS, then the SATS will allow power from a reserve source to be restored in less than 0.5s.
- The SATS moves the potential single point of failure closer to the user, as there is only the IPS transformer and final circuit remaining as a single path.
- It may be installed as an automatic UPS By-pass switch, operating in the unlikely event of a catastrophic UPS failure
- SATS keeps the TN-S (grounded) supply in a completely separate housing to the IT (ungrounded) supply.
- Where many IPS systems are supplied from a single source, a delay can be set, to sequence the supply return changeover to avoid multiple simultaneous in-rush currents.



### Medical Isolation Transformer

Starkstrom transformers are manufactured in accordance with IEC 61558-2-15 edition 2, with the following additions:

- The leakage current of the output winding to earth does not exceed 0.5 mA.
- Single-phase transformers are only available with a rated output of between 0.5 kVA and 10 kVA inclusive.
- The medical isolation transformers are installed into the IPS panels at the manufacturer's facility. The IPS system is then tested, shipped, installed and commissioned as a complete system without any subsequent transformer removal and re-installation.

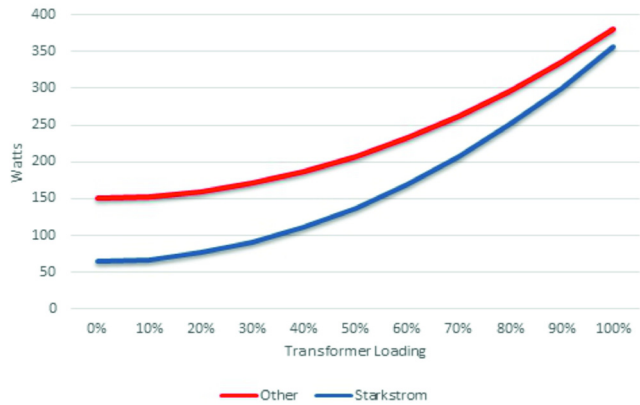
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### Heat Losses per Transformer

Starkstrom has invested in a range of transformers that are more efficient over their entire working range, and especially in the 0-50% loading area where the majority of the transformers operating life are spent.

Starkstrom transformers can generate energy savings of up to 63% compared to other suppliers of medical isolated transformers (see 10KVA comparison graph). This has the benefits of reducing direct energy costs and reducing the cost of removing the excess heat.

10kVA Transformer: Heat Loss Comparison



SIZE	NO LOAD HEAT LOSSES	FULL LOAD HEAT LOSSES	EFFICIENCY
4 kVA	37W	146W	96%
6.3 kVA	53W	254W	96%
8 kVA	50W	270W	97%
10 kVA	56W	345W	97%

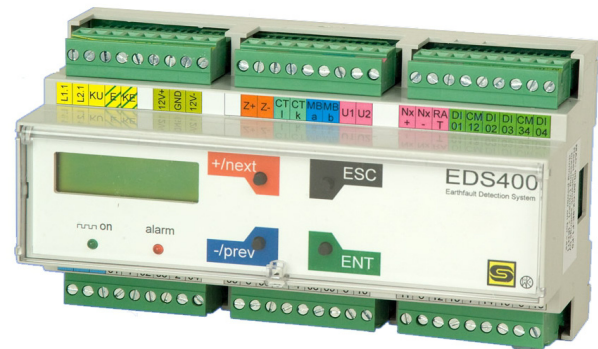
Starkstrom medical isolation transformers have been engineered to give a maximum of 8 times "in rush". We would suggest considering the following MCB's to allow adequate circuit protection. However, this must be confirmed with your project electrical designer.

- 4kVA Transformer 25 Amp 'C' Curve
- 6.3kVA Transformer 40 Amp 'C' Curve
- 8kVA Transformer 50 Amp 'C' Curve
- 10kVA Transformer 50 Amp 'D' Curve

### Insulation Monitor and Earth-Fault Detection System

Each IPS is fitted with a single integrated insulation monitor and Earth-Fault Detection System (EDS) unit. This has an embedded LCD display screen (minimum 2 lines of 15 characters) and can be navigated using 4 separate HMI buttons. The fascia is protected against accidental operation and physical damage using an integral clear top hinged Perspex cover.

The unit provides a continuous readout of insulation levels (displayed in kΩ) and transformer load (displayed in VA). It has a pulsing green LED to indicate a working system and a red LED to indicate a fault is present. Each unit has a minimum of 4 digital inputs to accept, monitor and display signals from remote equipment e.g. UPS alarms.



The unit complies with both IEC 61557-8 and IEC 61557-9 with the following specific requirements:

- The AC internal impedance will be at least 100kΩ
- The test voltage will not be greater than 25V DC
- The injected current, even under fault conditions, will not be greater than 1mA peak
- Indication will take place at the latest when the insulation resistance has decreased to 50kΩ
- A test device will be provided
- Indication is required if the earth or wiring connection is lost

## Installation Requirements

### Earthing

An earth conductor of a minimum 4 or 6mm<sup>2</sup> is required to connect all earth potentials to the main earth reference bar. Site specific calculations must be carried out to determine the cable specification. The maximum permissible resistance of the earth conductor between any given socket or extraneous metalwork and the EBB / ERB (Equipotential Bonding Busbar / Earth Reference Bar) shall not exceed 0.1Ω.

### Wiring and Sockets

For IPS circuits, both conductors should be coloured brown and identified as L1 and L2. In composite cables, conductors can be sleeved brown. This applies to conductors in the field as well as within the IPS panel. All socket outlets should be wired in a radial fashion from the IPS panel, such that each bed or patient area is supplied by at least two circuits.

Blue Starkstrom double pole, unswitched, clean earth sockets, engraved in white lettering 'Medical equipment only' are recommended for all IPS socket outlets.

### Commissioning

All field wiring should be fully proven, tested (to the relevant standards) and documented by the contractor. The contractor shall then employ the equipment supplier to commission the IPS system to the requirements of HD60364-7-710, HTM06-01, BS7671:2008 (including Amendment No 3: 2015).

## Standards

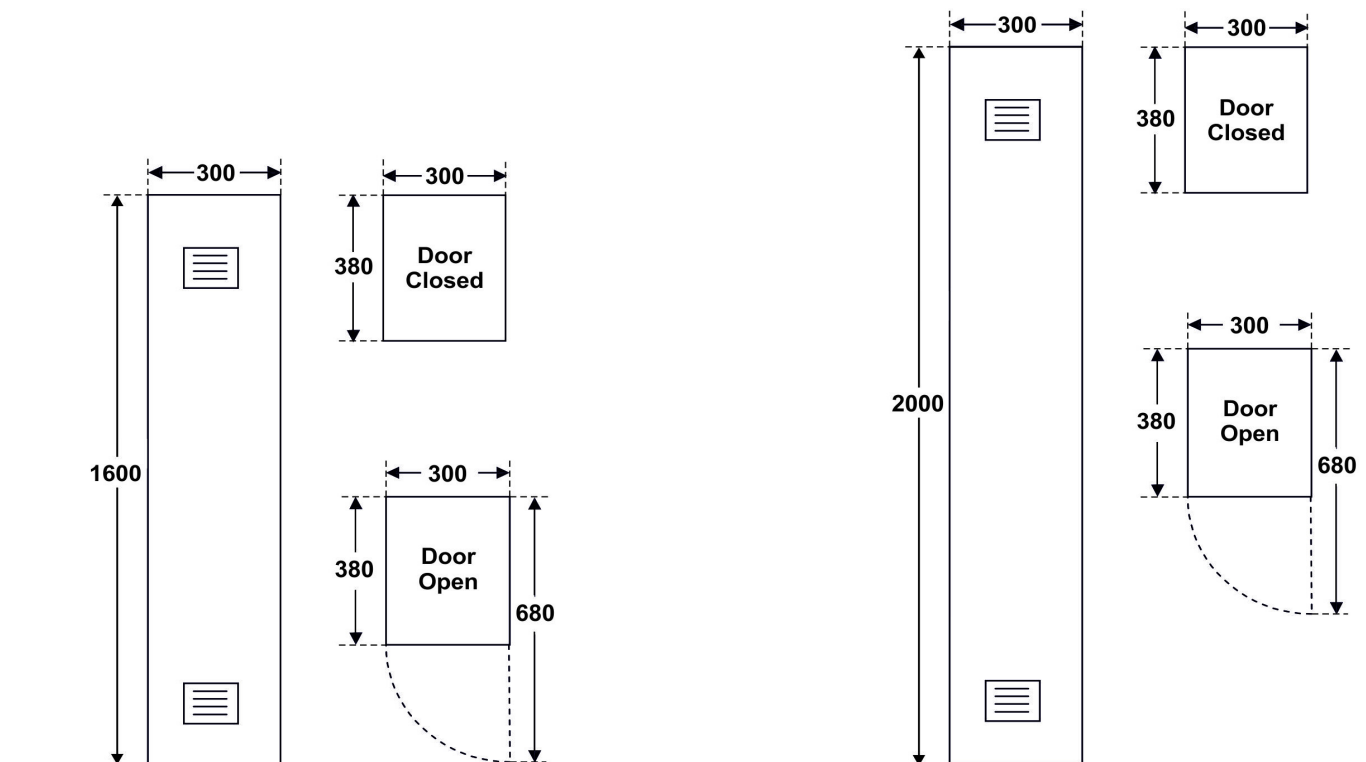
Starkstrom IPS systems fully comply with the following standards:

STANDARD	DESCRIPTION
<b>HTM06-01</b>	Electrical services supply & distribution: Part A – Design considerations
<b>IET Guidance Note 7 (4th edition)</b>	Electrical installations of buildings - Part 7-710: Requirements for special installations or locations - Medical locations
<b>MEIGaN v2.0 (withdrawn)</b>	Medical Electrical Installation Guidance: Second edition
<b>HD 60364-7-710 - 2012</b>	Low-voltage Electrical Installations - Part 7-710: Requirements for Special Installations or Locations - Medical Locations
<b>BS: 7671 (17th Edition) Including Amendment No 3 (2015)</b>	Requirements for electrical installations: IET Wiring Regulations

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### Construction and Dimensions

SIPS ENCLOSURE CONSTRUCTION	
Maximum Dimensions	2000mm(H) x 300mm(W) x 380mm(D) (door closed) 2000mm(H) x 300mm(W) x 680mm(D) (door open)
IP Rating	IP54
Material	6112 Grade Mild Steel
Finish	RAL7032W (Powder Coated)
Front Door Fixing	Lockable Handle and Interlocking Mechanism
Fan and Filter arrangement	Upper Fan and Filter Unit Lower Filter unit
Fan and Filter Size	105mm x 105mm
Gland Plate Top Mounted	140mm x 230mm
Copper Earth Bar (Cross Section)	15mm x 3mm (with M5 threaded connections)



All dimensions in mm

Standard IPS Enclosure

High Capacity IPS Enclosure

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