i-STS

Model A

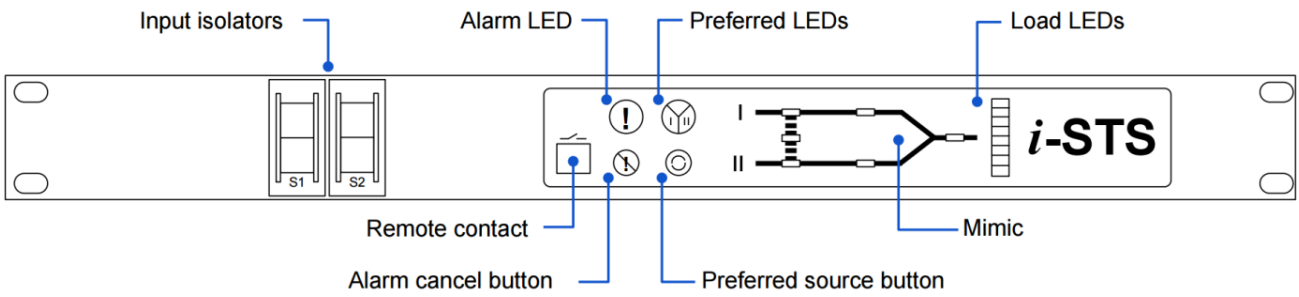
User Manual

19-inch Rack Mount – STS 16/32 A1P2

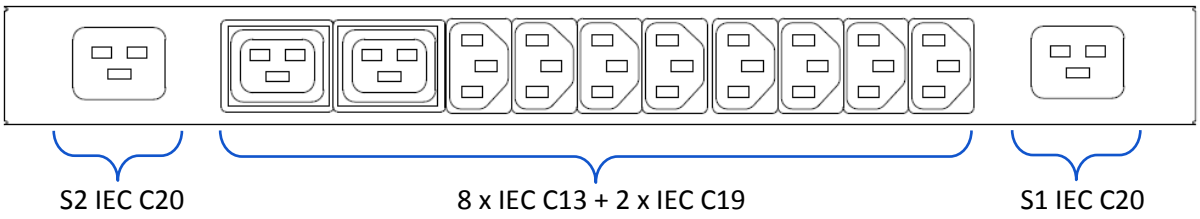
CONTENTS

OVERVIEW

MODEL A LAYOUT



16A



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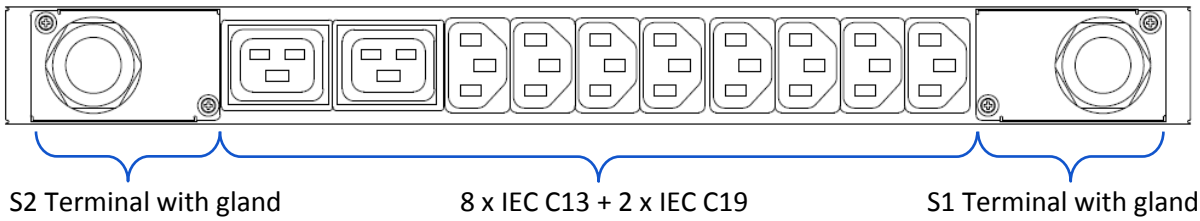
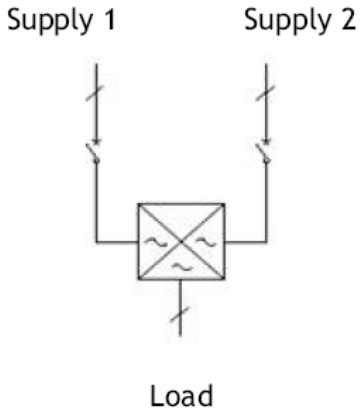


OPERATIONAL DESCRIPTION

A Static Transfer Switch (STS) provides your critical load or single chord (single supply), equipment with an alternative supply source, thus increasing and improving power reliability and availability.

The Model A is a 2 pole, single phase 1RU 19-inch rack mount STS. Both the active conductor and the neutral are switched. Thyristors are used to undertake the switching process. These are many times faster and more reliable than their electromechanical equivalents.



The STS continuously monitors the supply sources and should the presently connected supply fail or degenerate to not be useable, the critical load is automatically and transparently transferred to the alternate source.

This switching process is undertaken as a break before make transfer. The break in the supply transition is so short that it is not seen by the critical load.

This is preferable to a make before break (or overlapping) changeover because when the two supplies are different and connected together large and unpredictable currents would flow between the sources degenerating both supplies and therefore the supply to the critical load.

In case of downstream fault the STS will not transfer the fault to the alternate supply even if the voltage is adversely affected. Once the fault current has cleared the STS will resume normal operation protecting the critical loads from voltage disturbances, (10 second settling time).

OPERATING PARAMETERS

ABSOLUTE MAXIMUM VALUES

Parameter	Min	Max
Input Voltage	-	265V
Load Current	-	16 or 32A
Input Synchronisation	-180°	180°
Ambient Temperature	-20°C	45°

RECOMMENDED VALUES

Parameter	Min	Max
Input Voltage	210V	255V
Load Current	1A*	16 or 32A
Input Synchronisation	-15°	15°
Ambient Temperature	0°	30°

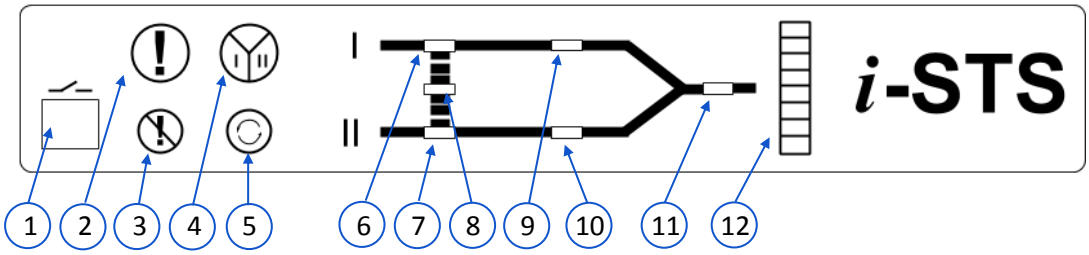
** Due to the nature of the silicone controlled rectifiers used in all static transfer switches, some current must be applied to the STS to ensure a clean break during transfers.*

OVERLOAD CAPACITY

Load	Time
80A	30s
100A	1s
1000A	20ms

User Interface

Front Panel Overview



	Name	Description
1	Remote Contact	For integration into BMSs, this voltage free alarm contact closes whenever the general alarm condition is flagged. 50VDC Max
2	Alarm LED	When there is an alarm that has not been acknowledged these LEDs will flash. If the alarm has been acknowledged but the condition still exists, the LEDs will remain solid
3	Alarm RST Button	Pressing this button acknowledges new alarms, causing the audible portion to turn off and the LEDs to go from flashing to solid.
4	Preferred Indicator	These three LEDs indicate which supply is selected as the preferred supply. Supply 1 (I), Supply 2 (II) or either (none) may be selected.
5	Preferred Button	Pressing this button repeatedly will scroll through which supply is selected as the preferred supply
6	Supply 1 Okay LED	Green/Red indicated that Supply 1 is within/out of tolerance
7	Supply 2 Okay LED	Green/Red indicated that Supply 2 is within/out of tolerance
8	Sync Okay LED	Green/Red indicated whether Supply 1 and Supply 2 are within/not within enough degrees of synchronization of each other to perform a transparent transfer
9	On Supply 1 LED	Green/Red indicates the load is on/not on Supply 1
10	On Supply 2 LED	Green/Red indicates the load is on/not on Supply 2
11	Output Okay LED	Green/Red indicated the output is OK/faulty
12	Load LEDs	There are eight LEDS here, the bottom six are green and indicate roughly 10% - 90% loaded. The seventh LED is orange and indicates 100% loaded. The eighth LED is red and indicates that the STS is over loaded. Refer to page 6 for details on STS overloaded behaviour

CONTROLS

Preferred Button

Pressing this button repeatedly will scroll through which supply is selected as the preferred supply. A transfer will occur after a 3 second delay if the unit is currently on the alternate supply.

If the user does not want a preferred source the button is pressed until Preferred Indicator shows that none is selected.

Alarm RST Button

The Alarm when activated will initiate an audible alarm condition which will be reset automatically once the condition returns to normal and or manually reset by the user by pressing the Alarms Reset pushbutton.

REMOTE CONTACT

It is prudent to provide physical separation between control circuits and power circuits. This avoids confusion, reduces interference and increases the reliability of your installation.

Make sure that all control wiring is protected and securely supported so that it is not inadvertently unplugged or removed whilst other equipment is being installed or removed within the enclosure.

Remote Monitoring Relay Status:

Contacts are Normally Closed. Contact is held Open when there is no alarm.
When power fails the relay contact closes (fail safe).
The Relay contact and the RED Alarm LED are driven by the same logic.

The LED / Relay is operated when:

- ON Supply 1 when priority is Supply 2
- On Supply 2 when priority is Supply 1
- Not in Synchronism
- Supply 1 or Supply 2 are not in spec.
- There is/was an overcurrent/overload/load fault condition
- There has been an SCR Fault
- The Auto retransfer to preferred source has locked out further transfers (max number of automatic re-transfers to the preferred supply has been exceeded).

Do not connect any more than 50 V DC 0.5 Amps. NOT SUITABLE FOR 230 V AC.

OPERATION SETTINGS

Operation settings can be configured using the rotary switch located on top of the unit. Described below are the three independent settings that be configured.

Sync	
Default	When supplies are more than 67º out of phase, a 50ms break will be inserted during a fault condition.
Short	When supplies are more than 67º out of phase, a 10ms break will be inserted during a fault condition.
Dynamic	An intelligent phase dependent break is inserted.
Ignore	Ignores phase difference.
Eco	
Off	Normal fault detection.
On	Breaks less than 5ms will not cause a transfer.
Alarm	
On	General alarm will generate a sound.
Off	General alarm will not generate a sound.

Rotary Position	SYNC	ECO	ALARM
0	Default	OFF	ON
1	Short	OFF	ON
2	Dynamic	OFF	ON
3	Ignore	OFF	ON
4	Default	ON	ON
5	Short	ON	ON
6	Dynamic	ON	ON
7	Ignore	ON	ON
8	Default	OFF	OFF
9	Short	OFF	OFF
A	Dynamic	OFF	OFF
B	Ignore	OFF	OFF
C	Default	ON	OFF
D	Short	ON	OFF
E	Dynamic	ON	OFF
F	Ignore	ON	OFF

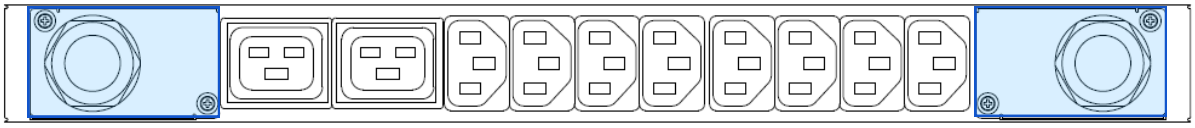
INSTALLATION

REAR DETAIL FOR 32A

The following figures detail the rear of the Model A 32A STS.

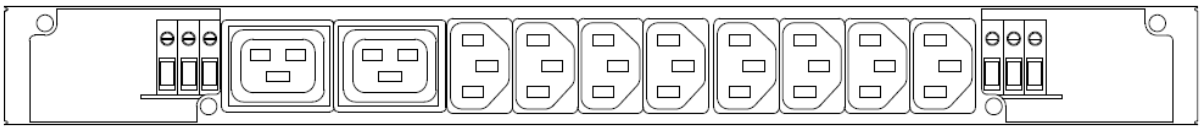
GLAND PLATES

To access the input supply terminals remove the 2 gland plates highlighted in red below:



CONNECTION DIAGRAM

Shown below is the connection diagram. Please note that the terminals do not have the same connection pattern for S1 and S2.



S2		
N	L	G

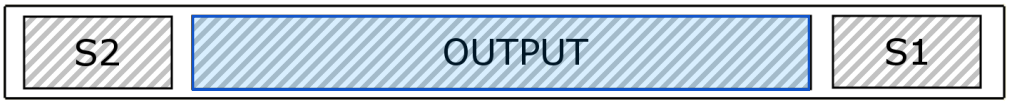
S1		
G	N	L

The terminals should be torqued to at least 0.5 Nm and no more than 0.6 Nm.

Maximum cable size is $6mm^2$.

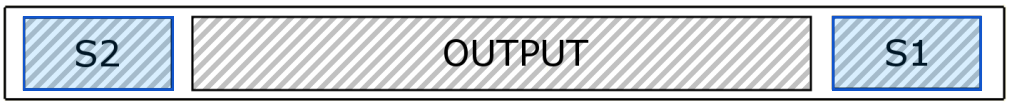
PROCEDURE

1. Ensure that your two input sources are within the tolerances outlined in the 'Recommended Values' table.
2. Secure the STS into your rack by the four holes provided in the front of the unit.
3. Plug the equipment that will be supplied by the STS into the output sockets at the rear of the STS.



Output Sockets - 8 x IEC C13 + 2 x IEC C19

4. Plug or terminate your two source leads into the input sockets or terminals of the STS and apply power. Please note that terminals should be torqued between 0.5-0.6 Nm.



Input Sockets - 2 x IEC C20 or Terminals

5. There will be a short (15 sec) start-up period, after which the STS will begin powering your equipment.

CONSIDERATIONS

Things to consider when connecting the Static Transfer Switch

Synchronism:

The smoothest change-over occurs when the supplies are in synchronism. Some equipment (like transformers) may saturate when a transfer occurs when not in synchronism. This causes large currents to flow into the load which could cause damage to the transformer, trip protective devices or blow fuses.
The STS is configured by default to have a 10ms power down break inserted if the phase difference between the sources exceeds 30 degrees.
The break has been inserted for a safe mode on purpose when the sources are out by more than 30 degrees. This has been done to allow the load to power off / then on again, this being safer than the alternative.

If possible it's best to make sure the supplies are in synchronism.

Remote Monitoring Relay Status:

Contacts are normally closed. Contact is held open when there is no alarm. Do not connect any more than 50 V DC 0.5 Amps.

Not suitable for 230 V AC.

SAFETY

The most crucial aspects of the install are Safety

- Damage to Goods
- Electrical Connectivity
- Mechanical Integrity
- Cooling
- Overloading

The STS is powered from two separate sources. It is important that you install correct signage and procedures within the enclosure and it's immediate vicinity to warn personnel of this aspect and what isolation, checking and precautionary processes, and procedures need to be adopted to make the STS and equipment connected to the STS safe to work on.

Caution:

This equipment receives power from more than one source. Disconnect output and all input sources of power from this equipment before servicing.

Do not proceed with the installation or operation of the STS if it has been damaged. Carefully inspect the STS for any damage that may have occurred during shipping, unpacking or during and after any installation process.

Take care when handling the STS and ensure that it is physically supported during the installation process. At the end of the installation process the STS should be firmly and securely bolted within the rack.

Ensure also that all of the cables are securely connected and supported and that all safety covers are installed. There should be NO live exposed or accessible contacts that could cause electrical shock if contact is able to be made.

This is especially important when plugging and unplugging the input (supply 1 or supply 2) plugs as leakage currents could cause dangerous voltages to appear on the incoming leads which can be a shock hazard and cause equipment damage if contact with other equipment is inadvertently made.

Caution:

This equipment is not suitable for installation into environments that utilise RCD earth leakage detectors on the inputs of the static transfer switch.

Warning:

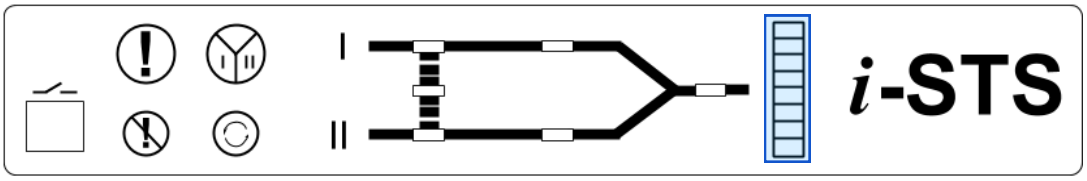
High leakage currents on isolated incoming and outgoing circuits.

Earth connection is essential before working on circuits or connecting / disconnecting supplies.

TREAT AC INCOMING LEADS AS LIVE IF DISCONECTING FROM SOURCE

OUTPUT LOADING

Highlighted below on the front panel are the Load Indicator LEDs. Whilst the LEDs are in the green area the unit is operating within its design limits. If the Red LED bar is lit then the unit is overloaded and the load should be decreased.



Front Panel – Load LEDs

In addition there may be loading limitations when using the IEC inlet plugs and outlet sockets as they are rated for 10 and 16 Amps maximum only.

Each of the IEC C13 outlets is rated for 10 Amps; however, the load of the sum of each block of 4 must not exceed 15 Amperes in total. In addition there are 2 x IEC C19 outlet sockets. Each is rated for up to 16 Amps. Please ensure that the total loading does not exceed the incoming supply capacity (it may be limited by the incoming IEC connections).

Warning:

Both the rating of the unit and the incoming source leads should be considered so that it is not overloaded.

Before powering the STS up ensure that the load side is safe and any equipment or cabling connected is ready to be safely powered up.

Do not open the STS.

If it is faulty it should be removed from service and returned for analysis and repair.

Provided these precautionary aspects are headed the STS will provide you with a reliable back-up supply capability.

FAULT DIAGNOSIS & MAINTENANCE

The STS has been manufactured to provide a long, reliable and useful life. However, all equipment needs some maintenance.

RECOMMENDED SCHEDULE

The unit should be checked once every 6 months, sooner if the environment is bad:

- Check the LED states to ensure that the STS is online, (on preferred if selected) and that there is no alarm condition LED lit (RED).
- Remove dust from the front grill and heat sinks.
- Inspect cable / plug connections for overheating.

Warning:

The user should not undertake repair procedures or access the internals of the equipment. If the unit is faulty then it should be removed from service and returned for repair.

SPECIFICATIONS

Power	
Type	2 poles / 1 phase (4 x AC static switches)
Current Rating	16A or 32A
Nominal Voltage	115 or 230V +- 20%
Fault Current	1kA for 20ms, 100A Fused
Frequency	50 / 60Hz (auto detection)
THD	15%
Power Factor	No Limit
Crest Factor	3.5:1
Overload Capacity	80A for 30 sec 100A for 1 sec 1000A for 20 ms
Inputs	16A: IEC 19 sockets. 32A: 6mm^2 Block Terminals
Outputs	8 x IEC 13 outlets 2 x IEC 20 outlets
Switching	
Transfer Type	Thyristor / SCR - Break before make
Detection	Digital, < 1ms
Break Time	Normal: < 1ms Max: < ¼ cycle
Communication and Control	
User Interface	LED mimic and load indication. Preferred supply and alarm cancel buttons.
Contacts: Out	1 x voltage free general alarm indicator
Physical	
Dimensions (mm)	44h x 483w x 285d
Weight	2.5kg
Colour / Finish	Black / Power coat
Compliance	
Regulatory Approvals	AS3100 & ASNZ/IEC 62310-1,2 & 3, CE Approval
Standard Warranty	36 months repair or replacement policy

i-STS

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