

The power behind competitiveness

# Delta InfraSuite Power Management

Static Transfer Switch (STS), 380/ 400/ 415 Vac  
800A-Bottom Cable Entry

User Manual

## SAVE THIS MANUAL

This manual contains important instructions and warnings that you should follow during the installation, operation, storage and maintenance of this product. Failure to heed these instructions and warnings will void the warranty.

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# Chapter 1 : Important Safety Instructions

## 1.1 Installation Warnings

- This is a three-phase four-wire static transfer switch (hereafter referred to as 'STS'). It can be used for commercial and industrial applications.
- Install the STS in a well-ventilated indoor area, away from excess moisture, heat, dust, flammable gas or explosives. To avoid fire accidents and electric shock, the indoor area must be free of conductive contaminants. For the temperature and humidity specifications, please refer to **Appendix 1: Technical Specifications**.
- Leave adequate space around all sides of the STS for proper ventilation and maintenance. Please refer to **5.2 Installation Environment**.
- Only Delta Engineer and/ or Delta service partner are authorized to perform startup, commissioning and maintenance of Delta Equipment. All unauthorized startup or maintenance will void the Delta factory warranty.
- Do not drill holes on the STS. Drilling operations must be approved by the Delta's FSR department in advance. Failure to heed these instructions and warnings will void the warranty.
- Do not step, stand, or sit on the STS; otherwise, personal injury and/or equipment damage may occur.

## 1.2 Connection Warnings

- Before applying electrical power to the STS, make sure that the STS is grounded to avoid a possible risk of current leakage.
- Both input source 1 (S1) and source 2 (S2) require upstream circuit breakers for overload protection (provided by the customer). Refer to the table below for recommended rating.

Rated Operational Voltage (Ue)	Rated Current (In)	Interrupting Rating
600Vac	800A	IEC 65kA @ 415V

## 1.3 Usage Warnings

- Only qualified service personnel can upgrade the STS's firmware.
- Before installation, wiring and working on the STS's internal circuits, please cut off all power supplying to the STS completely.
- Do not install or wire the STS until both input sources are de-energized.

- The vents and openings on the STS are designed for heat dissipation and should not be blocked or covered at any time.
- Before applying electrical power to the STS, you must allow the STS to adjust to room temperature 20 ~ 25°C (68 ~ 77°F) for at least one hour and ensure that there is no moisture condensing inside the unit.
- Fuse replacement must be performed by authorized service personnel.
- When the STS is energized, do not open or remove its covers or panels.
- Fans and components should be replaced prior to the recommended end of life cycle.
- You must contact Delta customer service if any of the following events occurs:
  1. Any liquid such as water splashes into or on the surface of the unit.
  2. If the unit is dropped or damaged during shipping and handling.
  3. Any conductive powders or metals enter into the unit.
  4. Any fault or alarm occurs.

## **1.4 Storage Warnings**

- Use the original packing materials to pack the STS to prevent any possible damage from rodents.
- If the STS needs to be stored prior to installation, it should be placed in a dry indoor area. The allowable storage temperature is below 80°C (176°F) and relative humidity is below 95%.

## **1.5 Standard Compliance**

- IEC 62310
- EN 50082-1
- ICC-ES AC156 Qualification

# Chapter 2 : Introduction

## 2.1 General Overview

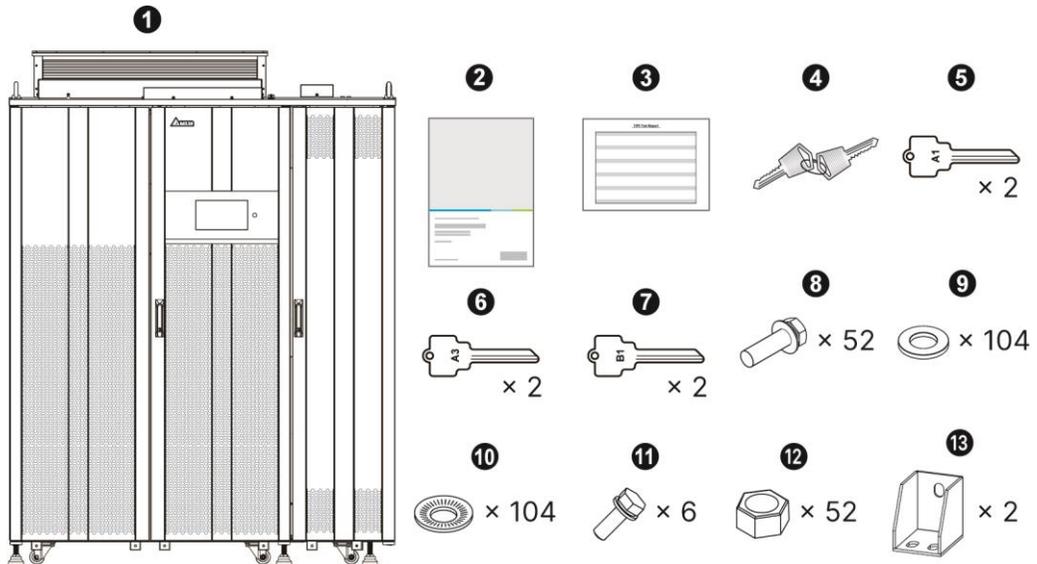
The Delta three-phase four-wire STS is designed to provide an automatic and seamless transfer between two independent input power sources to its connected loads without power interruption. The unit will transfer to its alternate source when available if the preferred source is out of the acceptable range set during the startup.

A user-friendly graphical 10" color touch panel is equipped for users to easily operate and clearly understand the STS's status. The redundant design of circuits, power supplies, control units and fans can eliminate any single-point failure, which enhances overall reliability of the unit.

## 2.2 Package Inspection

During STS transportation, some unpredictable situations might occur. It is recommended that you inspect the STS's exterior packaging. If you notice any damage, please immediately contact the dealer from whom you purchased the unit.

Please check if any item is missing according to the following package list. If the STS needs to be returned, carefully repack the STS and all of the accessories using the original packing materials that came with the unit.



No.	Item	Q'ty
①	STS	1 PC
②	User Manual	1 PC
③	Test Report	1 PC
④	Key for the Front Doors	2 Copies
⑤	Key for the Kirk-key Interlock (A1)	2 Copies
⑥	Key for the Kirk-key Interlock (A3)	2 Copies
⑦	Key for the Kirk-key Interlock (B1)	2 Copies
⑧	M12 Bolt	52 PCS
⑨	Flat Washer	104 PCS
⑩	Belleville Washer	104 PCS
⑪	M10 Bolt	6 PCS
⑫	M12 Nut	52 PCS
⑬	Top Bracket	2 PCS

## 2.3 Functions & Features

- Cable entry from bottom.
- Equipped with key-interlock bypass breakers\*<sup>1</sup> to facilitate seamless manual transfer to manual bypass on either source.
- Equipped with a BMS (Building Management System) port on the top of the STS for easy connection.
- All breakers\*<sup>1</sup> installed in the STS are front mounted and hot swappable (if the breakers\*<sup>1</sup> are not in the power-feeding loop).



### NOTE:

\*<sup>1</sup> Breaker(s) might be changed to switch(es) and quantity might be varied according to different models' applications. In this user manual, the wording 'breaker(s)' means breaker(s) or switch(es).

## 2.4 Exterior & Dimensions

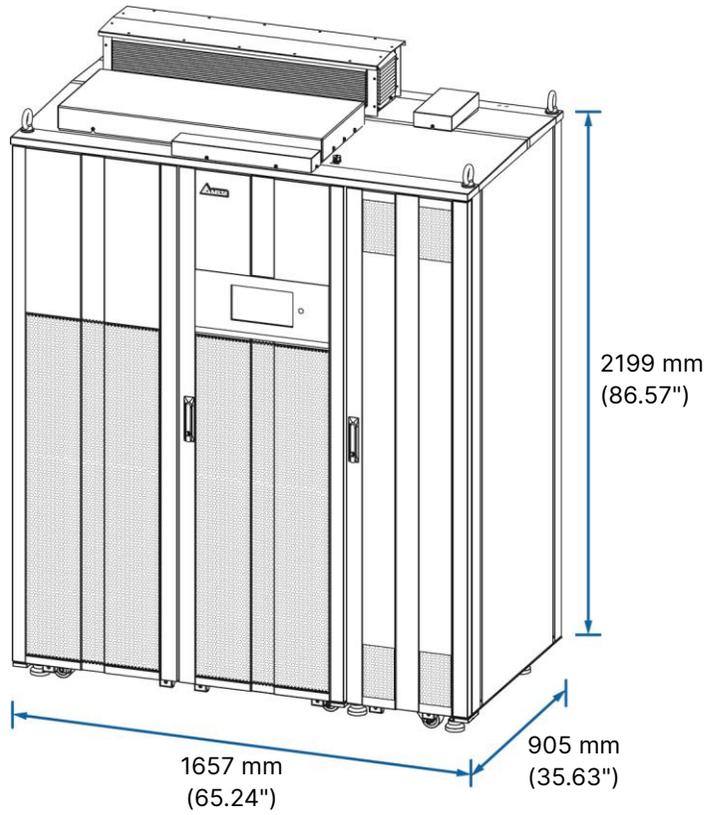


Figure 2-1: Exterior & Dimensions

## 2.5 Front View

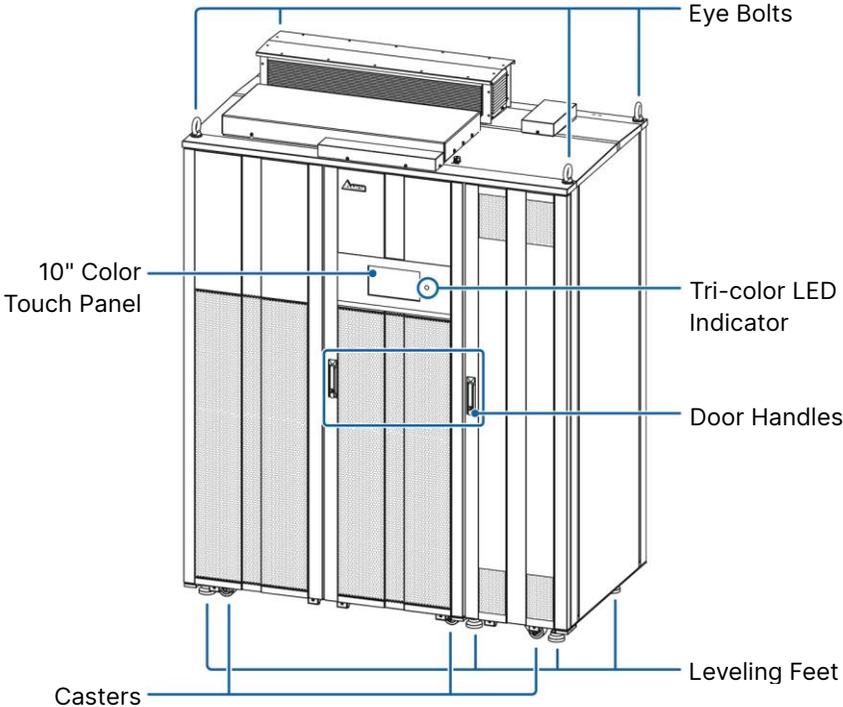


Figure 2-2: Front View

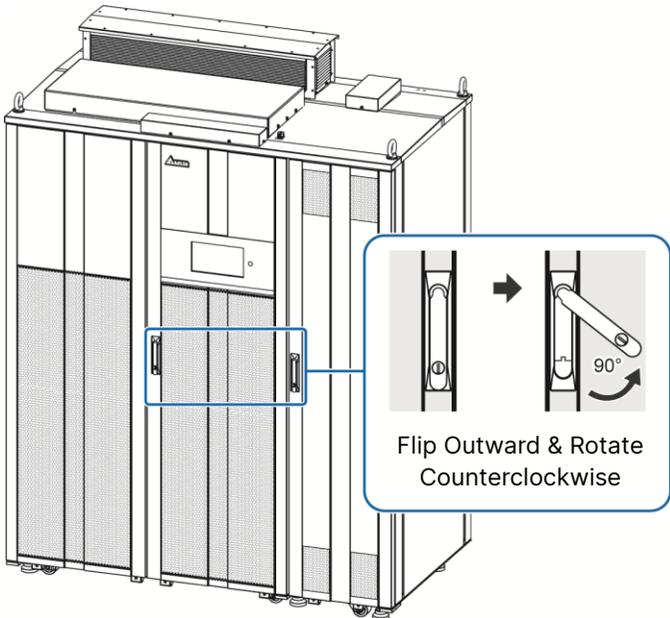


Figure 2-3: How to Open the Front Doors

## 2.6 Internal View with Left and Middle Front Doors Open



### WARNING:

Only authorized Delta engineers or service personnel can perform installation, wiring, panel & cover removal, maintenance and operation. If you want to execute any action mentioned above by yourself, the action must be under the supervision of authorized Delta engineers or service personnel.

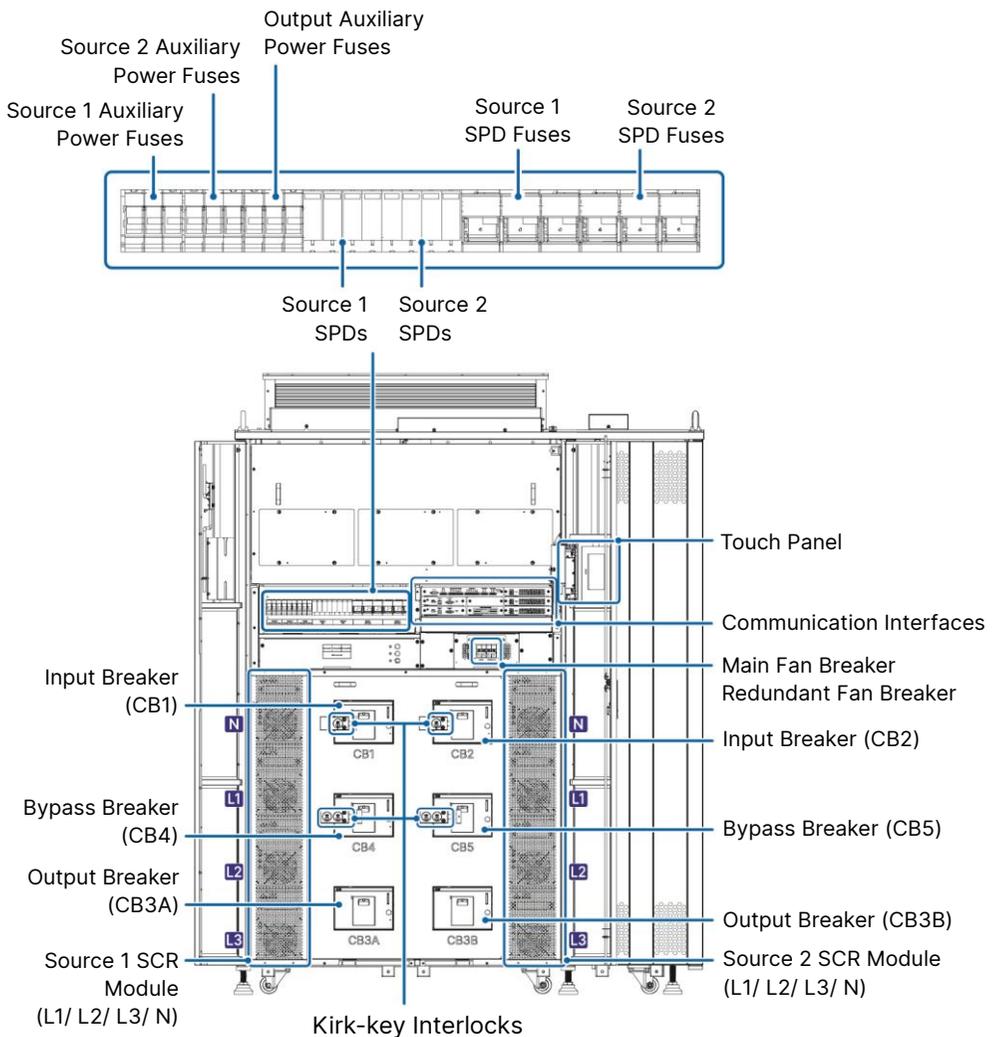


Figure 2-4: Internal View with Left and Middle Front Doors Open



### NOTE:

\*1 Breaker(s) might be changed to switch(es) and quantity might be varied according to different models' applications. In this user manual, the wording 'breaker(s)' means breaker(s) or switch(es).

## 2.7 Internal View with Right Front Door Open and Wiring Covers Removed



**WARNING:**

Only authorized Delta engineers or service personnel can perform installation, wiring, panel & cover removal, maintenance and operation. If you want to execute any action mentioned above by yourself, the action must be under the supervision of authorized Delta engineers or service personnel.

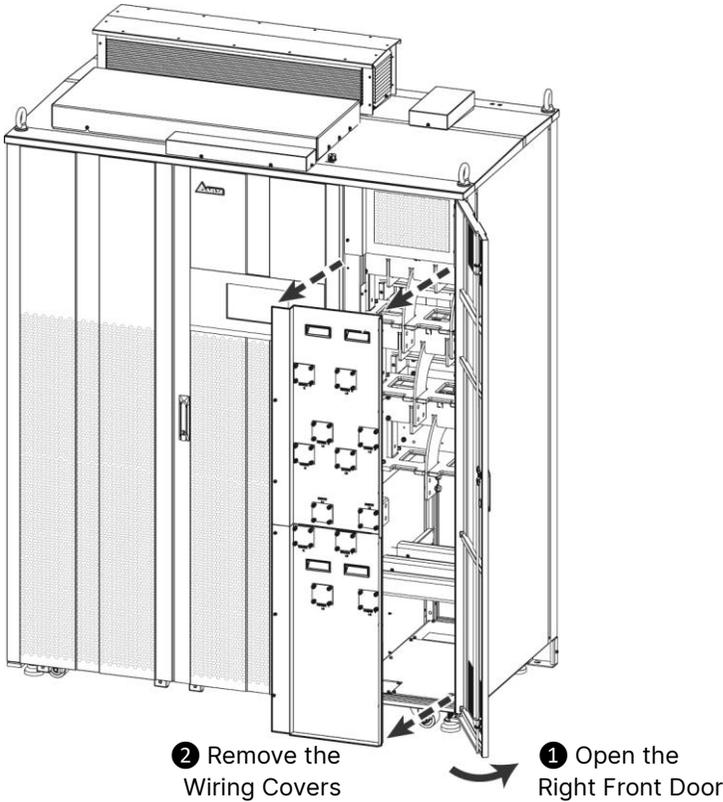


Figure 2-5: Open the Right Front Door and Remove the Wiring Covers

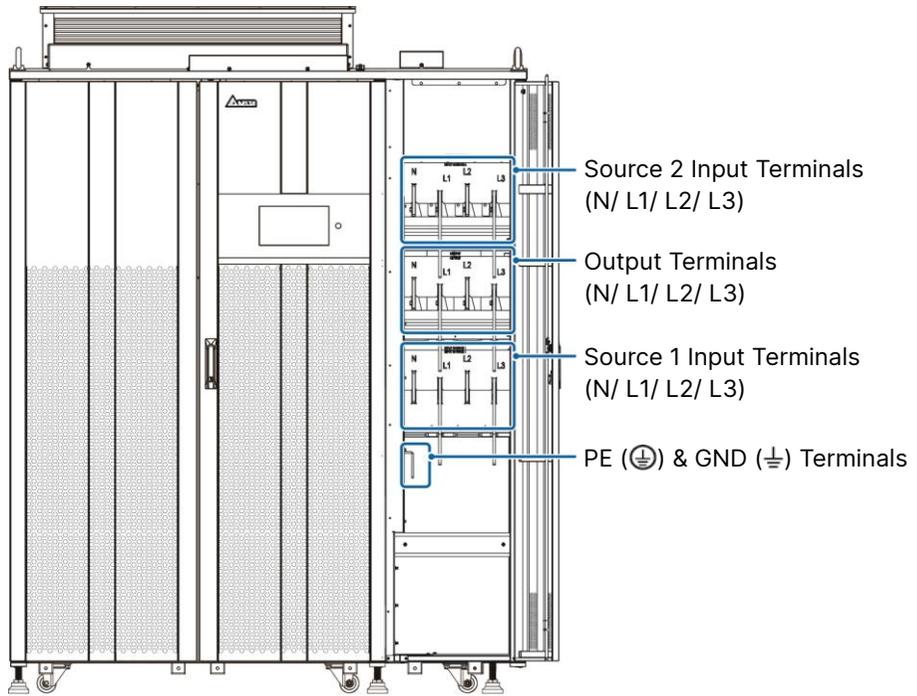


Figure 2-6: Wiring Terminals

## 2.8 Tri-color LED Indicator & Buzzer

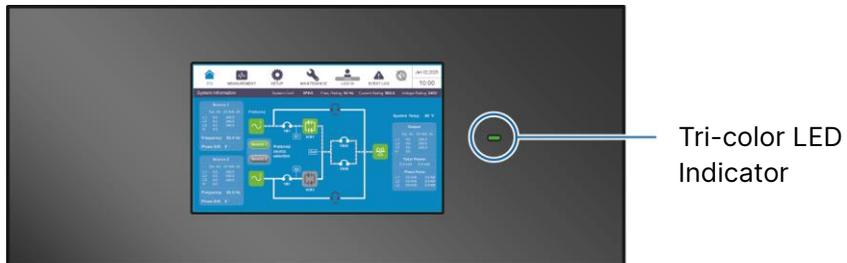


Figure 2-7: Tri-color LED Indicator Location



**NOTE:**

For information about the 10" color touch panel, please refer to *7. LCD Display & Settings*.

Table 2-1: Tri-color LED Indicator

Tri-color Indicator	Status	Meaning
Green	On	The STS operates normally and supplies power to the critical loads.
Yellow	On	<ol style="list-style-type: none"> <li>1. A minor or moderate alarm occurs, or</li> <li>2. The transfer between two input power sources is inhibited, or</li> <li>3. The bypass breaker (CB4 or CB5) is turned on.</li> </ol>
Red	On	A major alarm occurs.

Table 2-2: Buzzer

Alarm	Type	Frequency
Major	Long Beep	It sounds all the time.
Moderate	Fast Beep	It sounds 0.5 seconds every second.
Minor	Slow Beep	It sounds 0.5 seconds every 3 seconds.

## Chapter 3 : Operation Modes

The STS is designed with two sets of SCRs (Silicon Controlled Rectifier) to transfer its connected critical loads between two input power sources. In normal operation, the preferred source will feed the critical loads, and the unit will transfer to the alternate source when the preferred source is determined to be out of the voltage or frequency range set in the setting. The “Auto Retransfer” function will retransfer the loads back to the preferred source when the preferred source is back to the acceptable range and meets the transfer delay time. The preferred source can be selected by individual users via the input dry contacts, BMS communication and touch panel. “Voltage”, “Frequency” and “Auto Retransfer” can be set by individual users in the **SETUP** menu.

### 3.1 Normal

Under normal operating conditions, the STS supplies the loads from the preferred source and monitors the voltage, current and phase of both sources to make sure that both sources are operating within the set tolerances.

### 3.2 Auto Transfer

When the preferred source is out of the acceptable range and the alternate source is available and within the acceptable range, the STS will automatically transfer the critical loads to the alternate source. Auto retransfer back to the preferred source can be enabled in the setting.

#### 3.2.1 Manual Transfer

To manually transfer to the alternate source, the alternate source must be within the acceptable voltage range, and the phase difference between the two sources must be within the synchronous window. If the two sources are not synchronous, the transfer will be executed only after users confirm such transfer through a pop-up window on the touch screen.

Users can initiate a manual transfer by setting the alternate source as the preferred source via the input dry contacts, BMS communication or touch panel. For information about the operation, please refer to *4.1.2.5 Input Dry Contacts*, *4.1.4 BMS Port* and *7. LCD Display & Settings*.

#### 3.2.2 Automatic Retransfer

After auto transfer to the alternate source, the STS can use the “Auto Retransfer” function to transfer the loads back to the preferred source when the preferred source is back to an acceptable range and meets the “Retransfer Delay” time. The unit will make five attempts to retransfer back to the preferred source in five minutes. If all five attempts are unsuccessful, the unit will issue an alarm and inhibit any further retransfer attempt. Both the “Auto Retransfer” and the “Retransfer Delay” are set in the control setting (*7.6.3 Control*). The “Auto Retransfer” can also be enabled/ disabled via the BMS (*4.1.4 BMS Port*).

### 3.2.3 Automatic Retransfer Inhibited

After five fail attempts of auto retransfer in five minutes, the STS will issue an alarm and inhibit any further attempt. This alarm can be cleared after you select the alternate source as the new preferred source or there is a power failure at the alternate source that forces an emergency transfer back to the preferred source.

### 3.2.4 Emergency Transfer

When the source that is feeding the loads is out of the acceptable range, the STS will automatically perform an emergency transfer to the other source if it's available and within the acceptable range regardless of the phase difference between the two sources.

## 3.3 Load Current Transfer Inhibited

If the loads of the STS exceed the preset "S1/ S2 I-PK Transfer Lockout" value, it will be regarded as a fault condition or an inrush which has occurred at the output. Under such conditions, the "S1 I-Peak Over" or "S2 I-Peak Over" message will show on the screen, and the manual and automatic transfer will be disabled even if the preferred source's input voltage is out of the acceptable range. Automatic transfer can still occur when the STS detects an open SCR on the active source.

The "I-PK Reset" can be selected as manual or automatic in the **Control** tab of the **SETUP** menu. In auto reset, the alarm "S1/ S2 I-PK over" will be cleared within 100 milliseconds after the fault condition is cleared. In Manual reset, the alarm "S1/ S2 I-PK over" will not be cleared and the transfer will be inhibited until the user manually clear the alarm in the "Manual I-PK" in the **Control** tab of the **SETUP** menu.

For relevant LCD items, please refer to *7.6.3 Control*.

## 3.4 SCR Failure

When the STS detects a shorted SCR on the source feeding the loads, the STS will automatically trip the input breaker of the alternate source. When the shorted SCR is detected on the alternate source, the STS will also trip that source's input breaker.

If the STS detects an open SCR on the source feeding the loads, it will automatically transfer the loads to the alternate source to protect the critical loads.

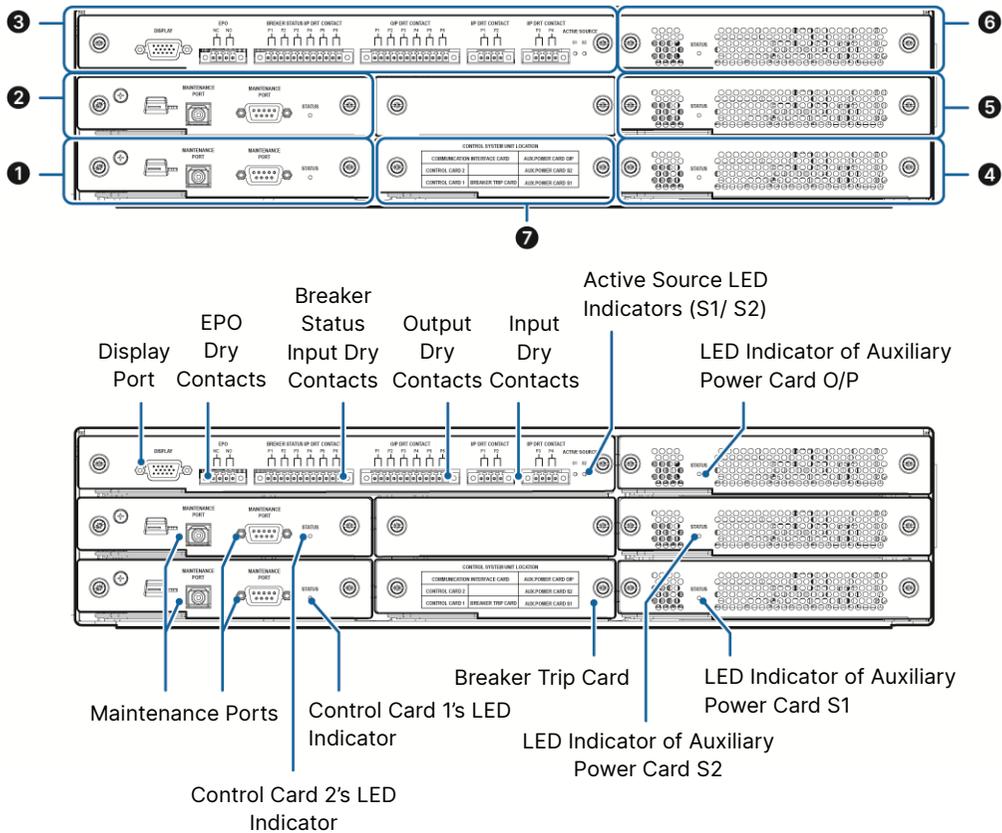
## 3.5 Manual Bypass

The bypass breaker (CB4/ CB5) is used to bypass the SCRs for maintenance; under such condition, the input source will directly feed the loads through its bypass breaker. All other breakers on the unit are used to isolate the power for maintenance.

# Chapter 4 : Communication Interfaces

The communication interfaces are located at three different places, on the front of the STS with its left and middle front doors open (see *Figure 2-4*), on the top of the STS (see *Figure 4-7*) and at the rear of the touch panel (see *Figure 4-9*).

## 4.1 Communication Interfaces (I): on the Front of the STS with Its Left and Middle Front Doors Open & on the Top of the STS



**Figure 4-1: Communication Interfaces (I): on the Front of the STS with its Left and Middle Front Doors Open**

No.	Item	Q'ty
①	Control Card 1	1 PC
②	Control Card 2	1 PC
③	Communication Interface Card	1 PC
④	Auxiliary Power Card S1	1 PC
⑤	Auxiliary Power Card S2	1 PC
⑥	Auxiliary Power Card O/P	1 PC
⑦	Breaker Trip Card	1 PC

### 4.1.1 Control Cards

The STS has two control cards for redundant use. Each card has one LED indicator and two maintenance ports. The maintenance ports are used for maintenance only. Users are not allowed to use them.

The LED indicator indicates the control card's status. Please refer to the figure below.

Status	LED Indicator	
	Green	Yellow
Master	ON	OFF
Slave	OFF	ON
Initialization	N/A	Flash

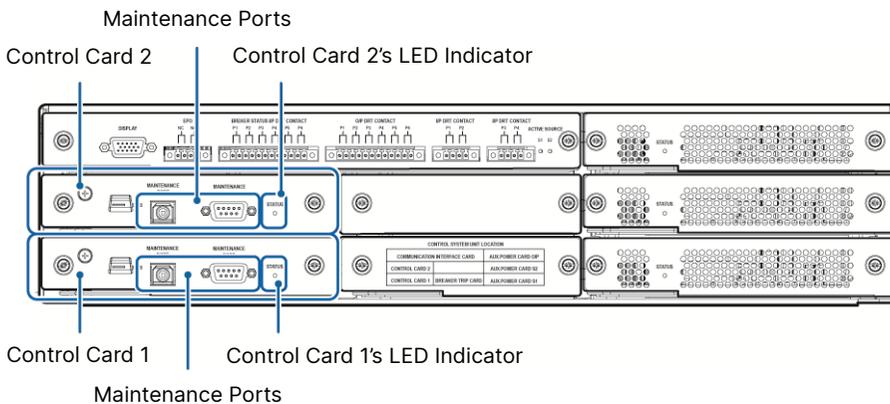


Figure 4-2: Location of the Control Cards

## 4.1.2 Communication Interface Card

### 4.1.2.1 Display Port

The display port has been connected to the 10" touch panel.

### 4.1.2.2 EPO Dry Contacts

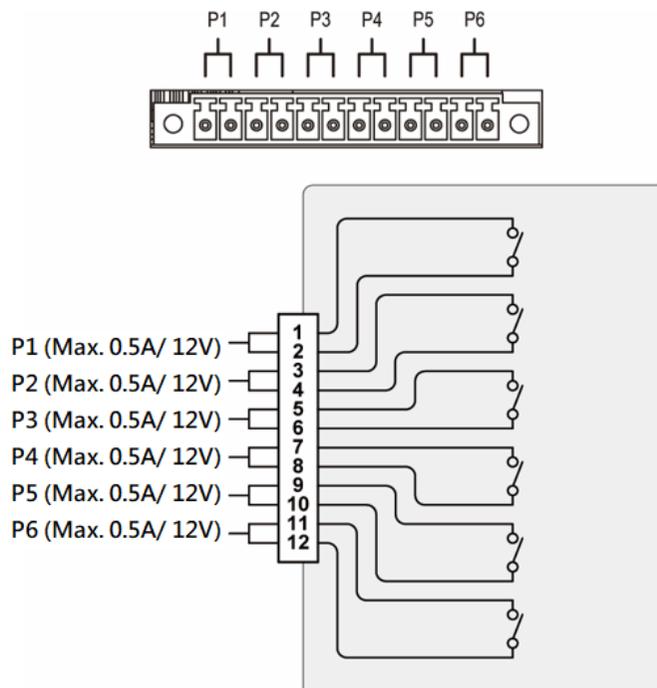
The EPO dry contacts are not applicable to this STS model.

### 4.1.2.3 Breaker Status Input Dry Contacts

The breaker status input dry contacts are not applicable to this STS model.

### 4.1.2.4 Output Dry Contacts

The STS is equipped with six sets of programmable output dry contacts (P1 ~ P6) that can be assigned events in the **Dry Contact Setting** in the **SETUP** menu. Below is the table of the events available and each can be set as either normally open (NO) or normally closed (NC) state according to your on-site requirements. Please refer to **7.6.4 Dry Contact Setting** for further details. For output dry contacts (P5 ~ P6), they are reserved for internal use.



(Figure 4-3: Output Dry Contacts & Schematic)

No.	Event	Description
1	None	No set-up.
2	S1 Fail	Source 1 is out of the acceptable range.
3	S2 Fail	Source 2 is out of the acceptable range.
4	Bypass CB4 Is Closed & S1 Is Bypassed	The bypass breaker (CB4) is turned on and the source 1's bypass is on.
5	Bypass CB5 Is Closed & S2 Is Bypassed	The bypass breaker (CB5) is turned on and the source 2's bypass is on.
6	Load on S1	The loads are supplied by source 1.
7	Load on S2	The loads are supplied by source 2.
8	Transfer Inhibited	The transfer between two input power sources (source 1 & source 2) are disabled.
9	Over Temperature	Any SCR has an over temperature issue.
10	Summary Alarm	When any STS alarm occurs, the STS will send a signal.

#### 4.1.2.5 Input Dry Contacts

There are four sets of programmable input dry contacts. The input dry contacts allow the STS to receive external signals from peripheral devices and let the STS response accordingly. Please use the touch panel to set each dry contact as normally open (NO) or normally closed (NC). Each input dry contact can be assigned a specific event. There are three events for your selection. For more information, please refer to the table below and *7.6.4 Dry Contact Setting*.

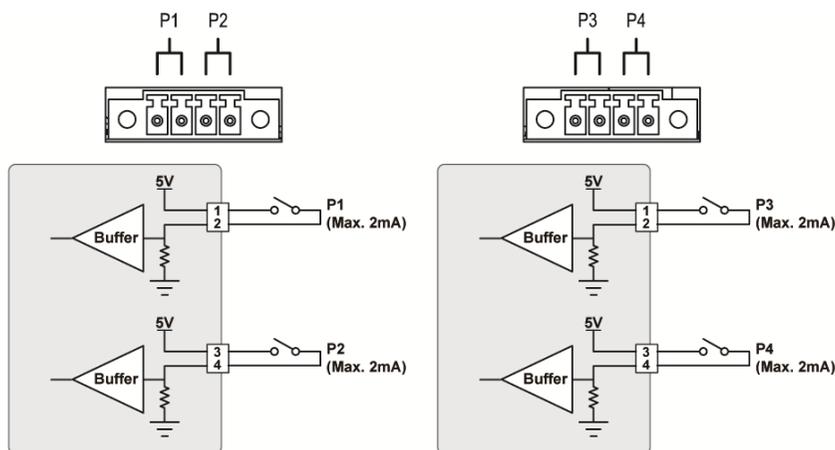


Figure 4-4: Input Dry Contacts & Schematic

No.	Event	Description
1	None	No set-up.
2	Preferred Source	Set source 1 or source 2 as the preferred source.
3	Transfer Inhibited	The STS will not switch its existing power source to the other source even if the existing power source doesn't supply power any longer.

#### 4.1.2.6 Active Source LED Indicators (S1/ S2)

The LED illuminating green indicates the corresponding active source (source 1 or source 2) is supplying power to the critical loads.

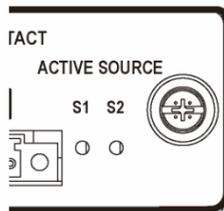


Figure 4-5: Active Source LED Indicators (S1/ S2)

#### 4.1.3 Auxiliary Power Cards

The STS has three auxiliary power cards. Each card has one LED indicator. If the auxiliary power card works normally, its LED indicator will illuminate green. If the auxiliary power card is off or abnormal, its LED indicator will be off.



**WARNING:**

You can only remove one card at a time for a replacement to avoid power interruption.

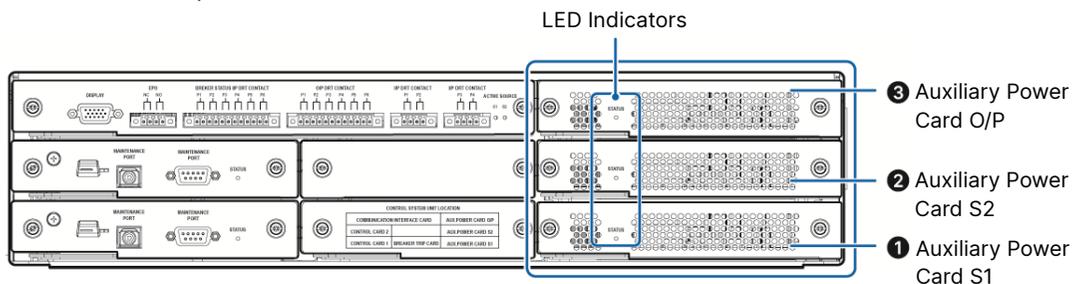


Figure 4-6: Location of the Auxiliary Power Cards

No.	Item	Description
❶	Auxiliary Power Card S1	Power is supplied by source 1.
❷	Auxiliary Power Card S2	Power is supplied by source 2.
❸	Auxiliary Power Card O/P	Power is supplied by output.

### 4.1.4 BMS Port

The BMS (Building Management System) port is located on the top of the STS. Before connection, remove the protective cap for access to the CAT6 connector. After that, connect the BMS port to your computer to monitor and control the STS.

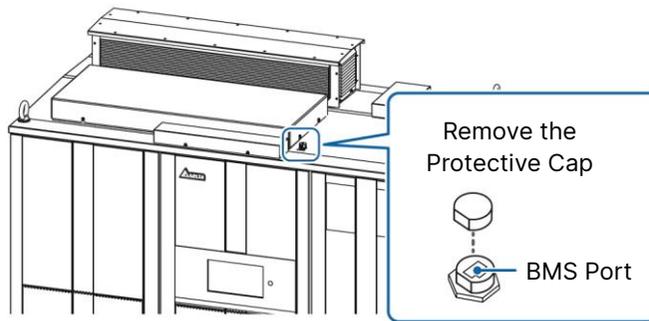
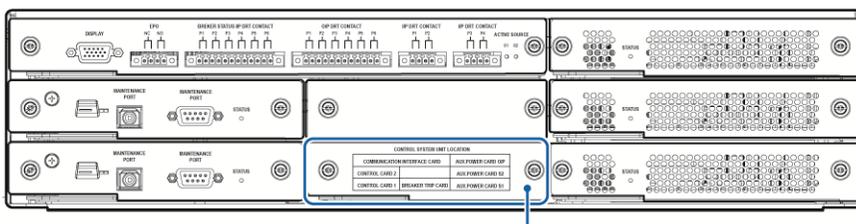


Figure 4-7: BMS Port on the Top of the STS

### 4.1.5 Breaker Trip Card

The breaker trip card has a driver circuit to trip off the input breaker (CB1 or CB2). Users are not required to operate this card. For further information, please contact Delta service personnel.



Breaker Trip Card

Figure 4-8: Location of the Breaker Trip Card

## 4.2 Communication Interfaces (II): at the Rear of the Touch Panel

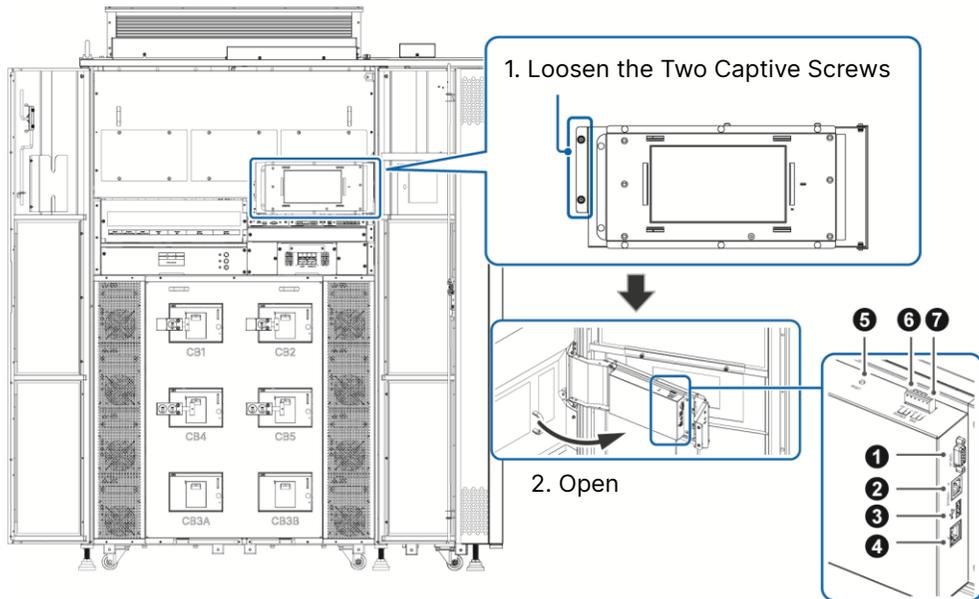


Figure 4-9: Communication Interfaces (II): at the Rear of the Touch Panel

No.	Item	Description
①	DISPLAY	Touch panel display port connection.
②	EMS/ CONSOLE	Reserved.
③	 (USB Port × 1)	Connect a user-supplied USB flash drive to the port to (1) upgrade the STS and LCD's firmware and (2) download event logs.
④	 (Network Port)	1. Provision of network communication service (including SNMP, Modbus TCP, HTTP, HTTPS, etc.). 2. Connect the port to a user-supplied monitoring system.
⑤	Reset	Press the <b>RESET</b> button to restart the LCD.
⑥	MODBUS (RS-485 Port)	1. Provision of Modbus RTU communication service. 2. Connect the port to a user-supplied monitoring system.
⑦	BMS	Reserved.

### 4.3 Cable Routing for the Communication Interfaces

For the cables that need connecting to the communication interfaces, **ONLY** bottom cable entry is applicable. Please ① open the left and middle front doors, ② connect the cables to the communication interfaces, ③ insert the cables into the snap bushings and ④ route the cables to the bottom of the cabinet.

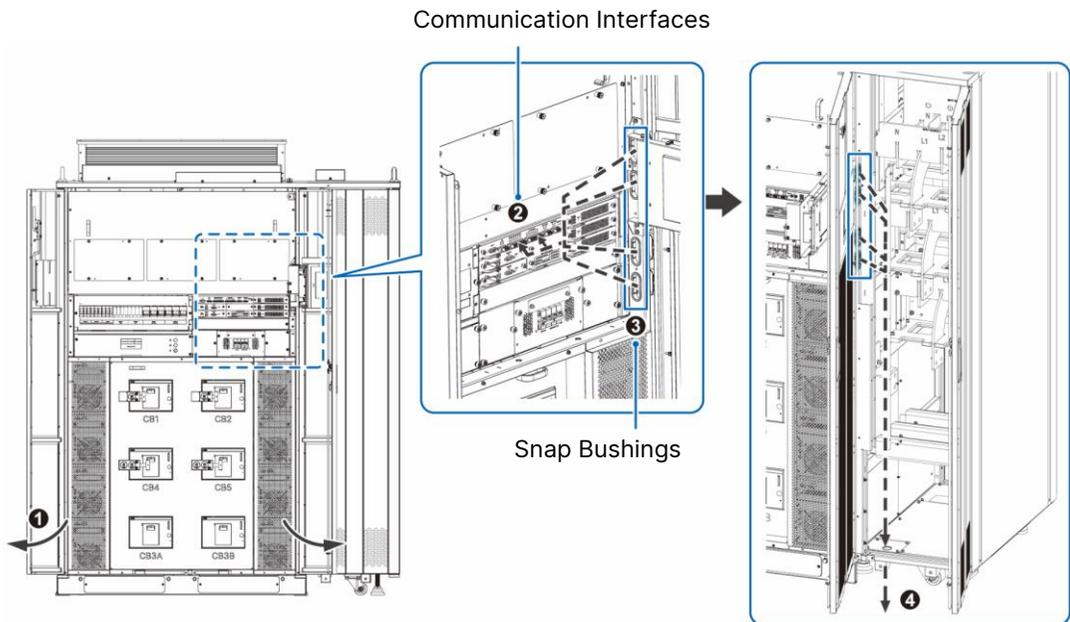


Figure 4-10: Bottom Cable Entry for the Communication Interfaces



#### NOTE:

1. Please follow local and national electrical codes to select cable sizes and install proper conduits and bushings for cable protection.
2. Only when **5.4 STS Installation** is completed can you perform wiring.
3. Cable ties are user-supplied and the quantity depends on on-site requirements.

# Chapter 5 : Installation and Wiring

## 5.1 Before Installation and Wiring

- Please read this user manual thoroughly before installation and wiring. If there are any questions or concerns, please contact your Delta representative. The STS requires startup and commissioning by an authorized Delta engineer or its service partner. Any unauthorized work performed on the unit will void the factory warranty.

## 5.2 Installation Environment

- Install the STS indoors. Do not place it outdoors.
- When moving and installing the STS, please consider its size and weight shown in the table below.

Table 5-1: STS Floor Weight Loading Table

STS Series	
Current Rating	800A
Net Weight	1360 kg (2998.29 lb)
Floor Weight Loading	906.92 kg/ m <sup>2</sup> (185.75 lb/ ft <sup>2</sup> )
Dimensions (W x D x H)	1657 x 905 x 2199 mm (65.24" x 35.63" x86.57")

- For cable entry, please reserve sufficient clearance to meet your local and national electrical codes. Only bottom cable entry is applicable.
- The following clearances are recommended for proper ventilation and maintenance access to the unit.
  1. Keep a distance of 1000 mm (39.37") from the front of the STS.
  2. Keep a distance of 1000 mm (39.37") from the top of the STS.
  4. Keep sufficient assembly space at the right side of the STS for other cabinet's installation.



**NOTE:**

Dust filters are installed at the rear of the STS's left and middle front doors prior to shipping. These filters must be inspected and cleaned regularly to maintain proper airflow in the unit.

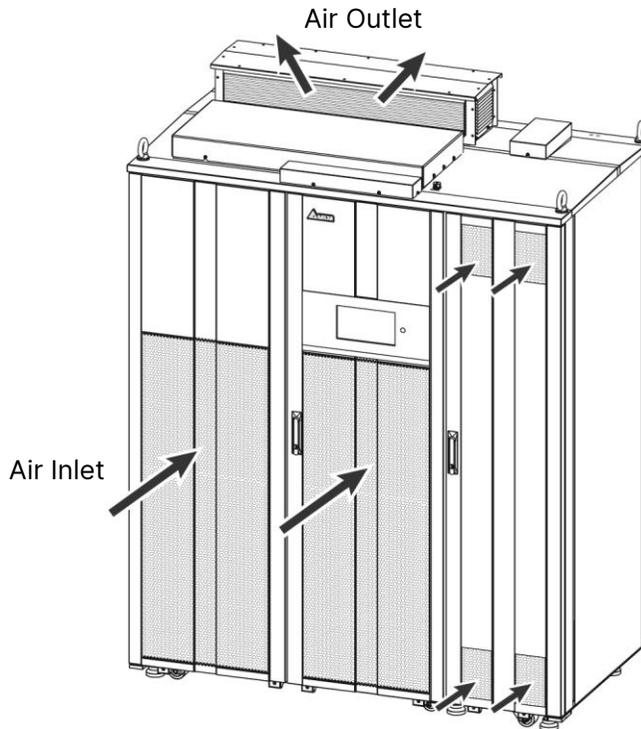


Figure 5-1: Air Inlet & Outlet Direction



**WARNING:**

1. Do not use air conditioners or similar equipment to blow into the top of the STS.
  2. Do not hinder ventilation of the STS.
- Keep the installation area clean. Please note that wiring routes must be hermetic to prevent possible damage from rodents.
  - The recommended ambient room condition for normal operation of the STS is temperature around 25°C (77°F) and humidity within 95%. The highest operating altitude is 1000 m (3280.84 ft) above sea level.
  - For safety concerns, Delta recommends the following:
    1. Equip surroundings of the installation area with CO<sub>2</sub> or dry powder fire extinguishers.
    2. Install the STS in an environment where fireproof materials are used to construct the walls, floors and ceilings.
    3. Install the STS on a floor that is made of noncombustible materials.

## 5.3 How to Move the STS to the Designated Area



### WARNING:

1. Only authorized Delta engineers or service personnel can move the STS to the designated area. If you want to execute the action by yourself, the action must be under the supervision of authorized Delta engineers or service personnel.
  2. The STS is mounted on the pallet with six rodent shields (including twenty-two M10 bolts and six M5 screws). Follow the *Unpacking Guide* attached to the wooden shipping crate to unload the STS from the pallet. The rodent shields, bolts and screws will be reused as permanent mounting components at its final installation area.
- Before moving the unit from the pallet to the ground, please remove the six rodent shields (including twenty-two M10 bolts and six M5 screws) at the bottom of the cabinet.

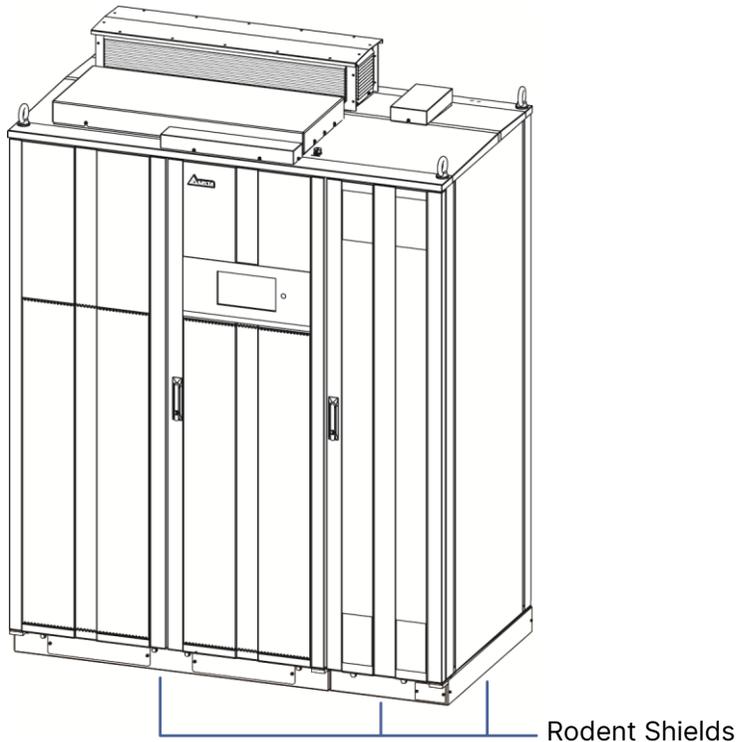


Figure 5-2: Location of the Rodent Shields

- On the top of the STS, there are four eye bolts which help you to move the STS to the designated area. Use four slings and hooks (provided by qualified service personal) to hook the eye bolts and lift the STS. Please note that the lifting strap angle must be more than  $45^\circ$  and the swing angle during lifting process must be less than  $15^\circ$ . Please refer to the figure below.

**WARNING:**

- Do not transport or handle the cabinet in a horizontal position and always keep the cabinet vertically under all circumstances
- Each sling and hook should bear the weight of 1360 kg (2998.29 lb).

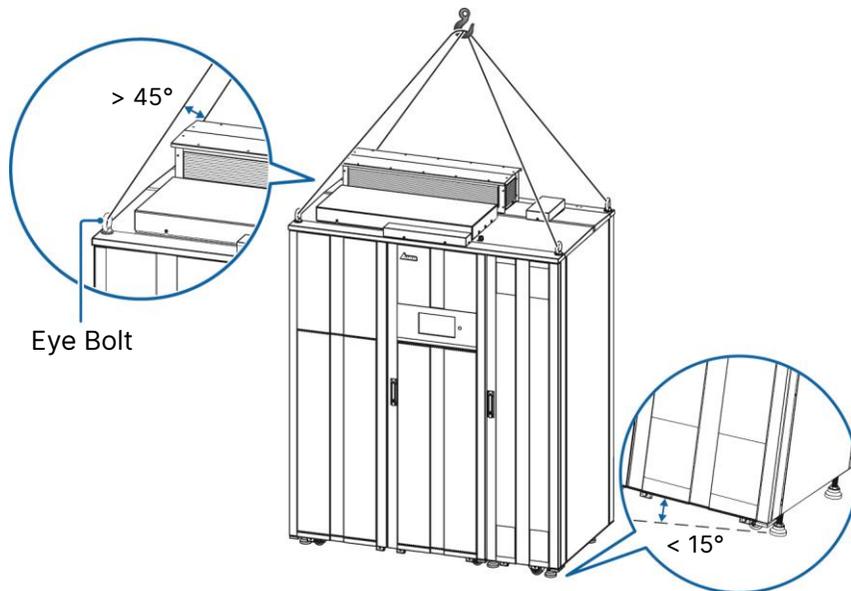


Figure 5-3: Lifting Strap Angle and Swing Angle

- The casters located at the bottom of the cabinet help you to move the STS to the designated area for a short distance. To prevent the leveling feet from damage in transit, rotate them counterclockwise with a 50 mm (1.97") wrench to raise them off the ground and move the unit carefully. Proper manpower and equipment (e.g. forklift) will be needed to avoid tipping the unit.

- These small casters are intended to be used on a smooth surface for a short distance. Please use appropriate equipment to move the unit over a long distance.

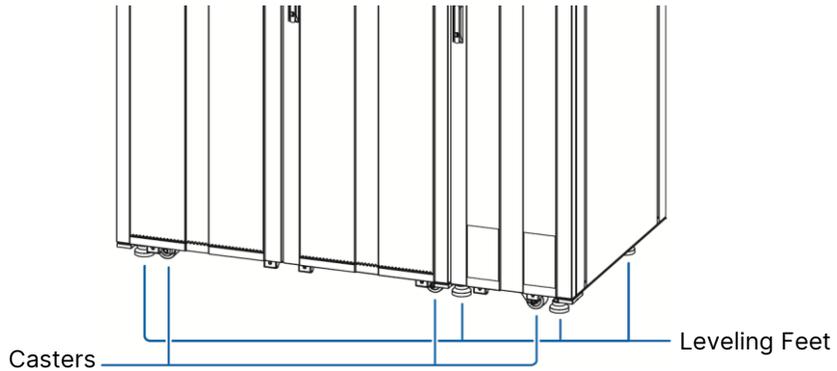


Figure 5-4: Casters & Leveling Feet

## 5.4 STS Installation

Please follow the steps below for proper installation of the STS.

### Step 1

Confirm the designated floor is level and can support the load bearing of the STS.

### Step 2

Follow the figure below to mount the sleeve and anchoring bolts (provided by qualified service personnel) on the floor where you want to install the STS.

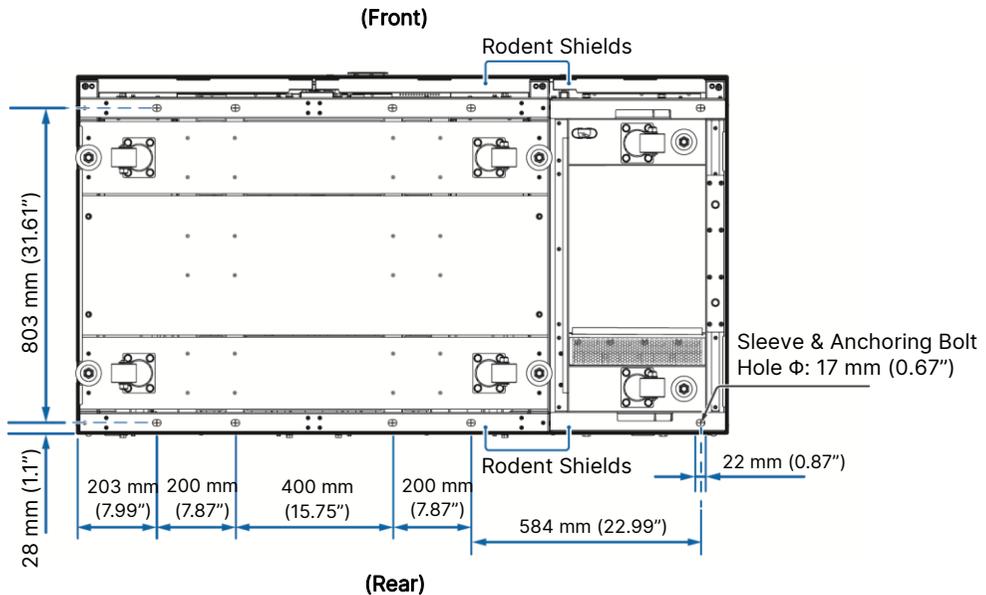


Figure 5-5: Cabinet Floor Fixing Points

**Step 3**

After moving the STS into place (please refer to **5.3 How to Move the STS to the Designated Area**), lower the four leveling feet with a 50 mm (1.97") wrench to properly level the unit and ensure that the STS is level and stable.

**Step 4**

Use the eight M10 bolts removed from the cabinet to mount the rodent shields at the front and rear bottom of the left cabinet.

**NOTE:**

*Figure 5-6 ~ Figure 5-9* only illustrates the front view as an example. Installation methods are the same for the rear side.

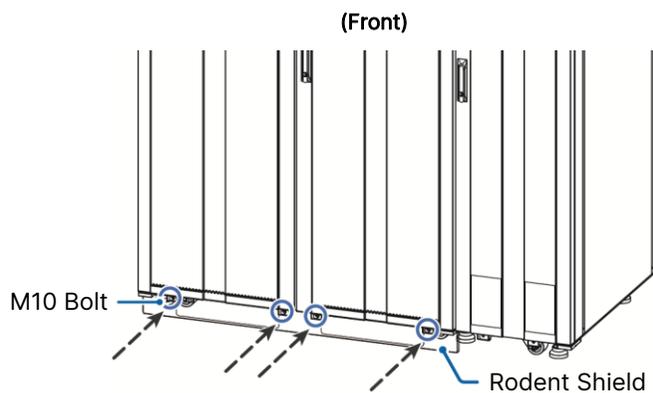


Figure 5-6: Install the Front and Rear Rodent Shields at the Bottom of the Left Cabinet

**Step 5**

Remove the covers of the front and rear rodent shields.

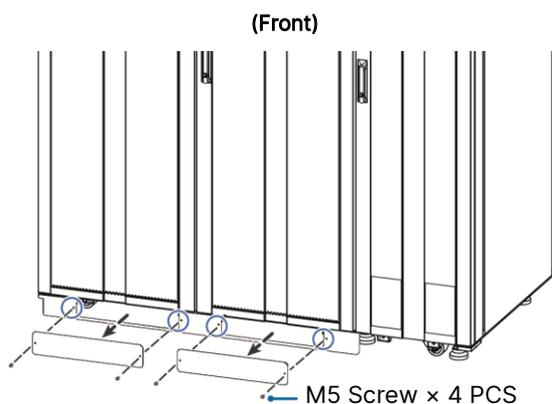
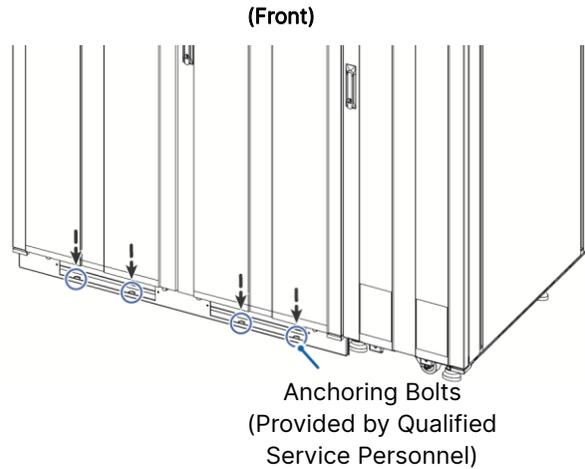


Figure 5-7: Remove the Covers of the Front and Rear Rodent Shields

## **Step 6**

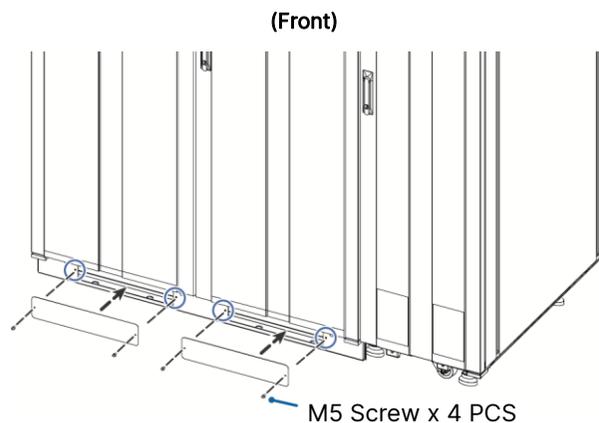
Use the anchoring bolts (provided by qualified service personnel) to mount the front and rear rodent shields on the ground.



**Figure 5-8: Mount the Front and Rear Rodent Shields on the Ground**

## **Step 7**

Reinstall the covers removed from the front and rear rodent shields.



**Figure 5-9: Reinstall the Covers of the Front and Rear Rodent Shields**



### **WARNING:**

The STS must be properly mounted in accordance with your seismic zone requirement.

### Step 8

If you want to install the STS against the wall, please use (1) the top brackets and six M10 bolts (provided in the package) and (2) sleeve & anchoring bolts (provided by qualified service personnel) as the mounting components for the unit. The sleeve & anchoring bolts must be properly sized for the installation location; please refer to the diagrams below. If there is no need to install the STS against the wall, please skip this step.

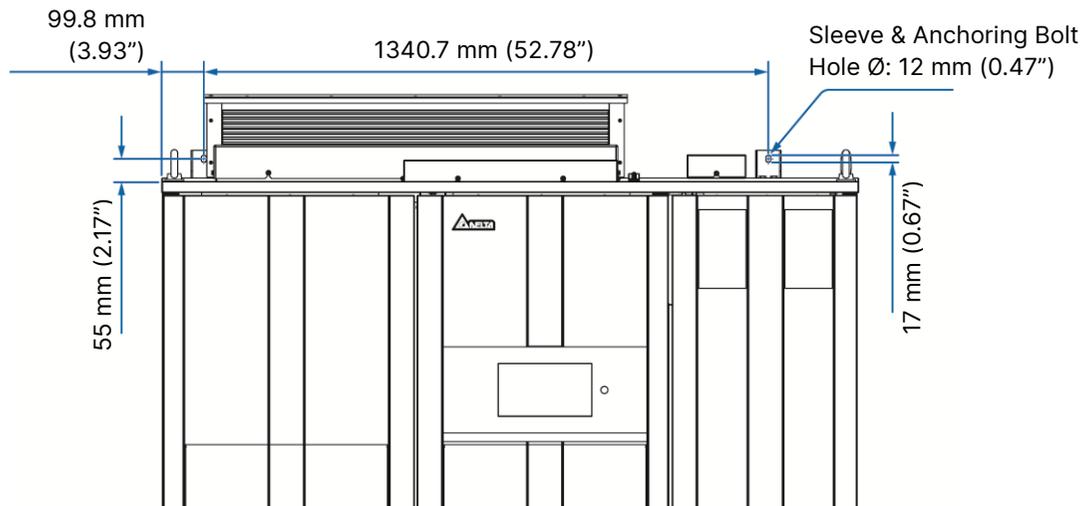


Figure 5-10: Wall Fixing Points

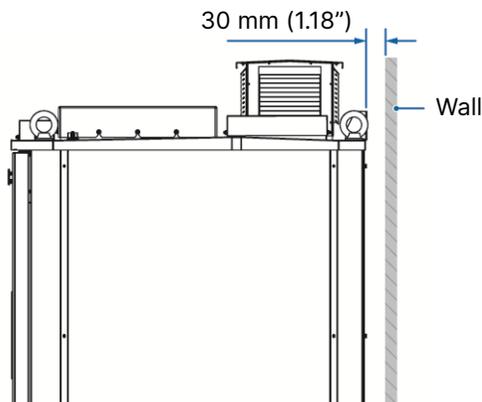


Figure 5-11: Clearance Requirement

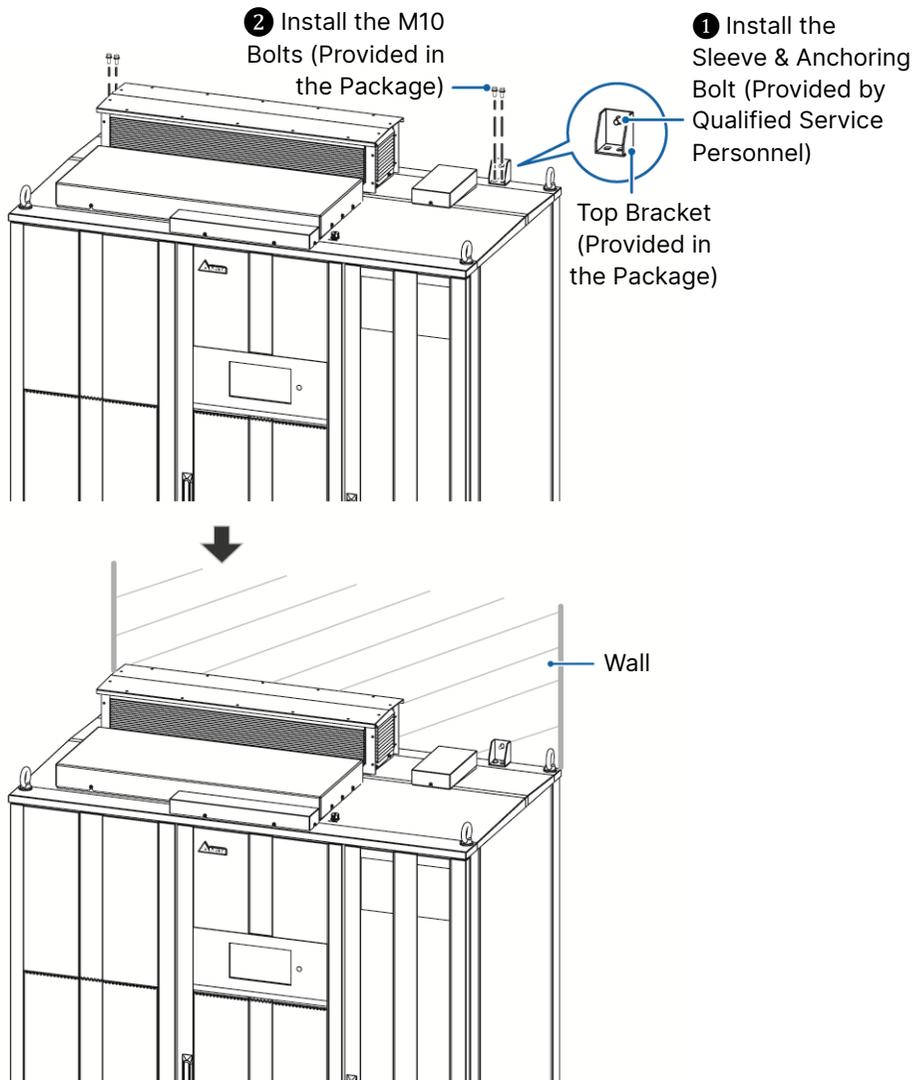


Figure 5-12: Install the STS against the Wall

**Step 9**

Follow **4.3 Cable Routing for the Communication Interfaces** and **5.5 Wiring** to perform STS wiring. Please note that section **5.5 Wiring** provides a guideline of Delta's recommendation on cable sizing, lugs and connectors for the unit, but all wiring for the unit must be done in accordance with local and national electric codes.

**Step 10**

After bottom wiring is completed, use the four M10 bolts and eight M5 screws removed from the cabinet to install the rest of rodent shields at the bottom of the cabinet.

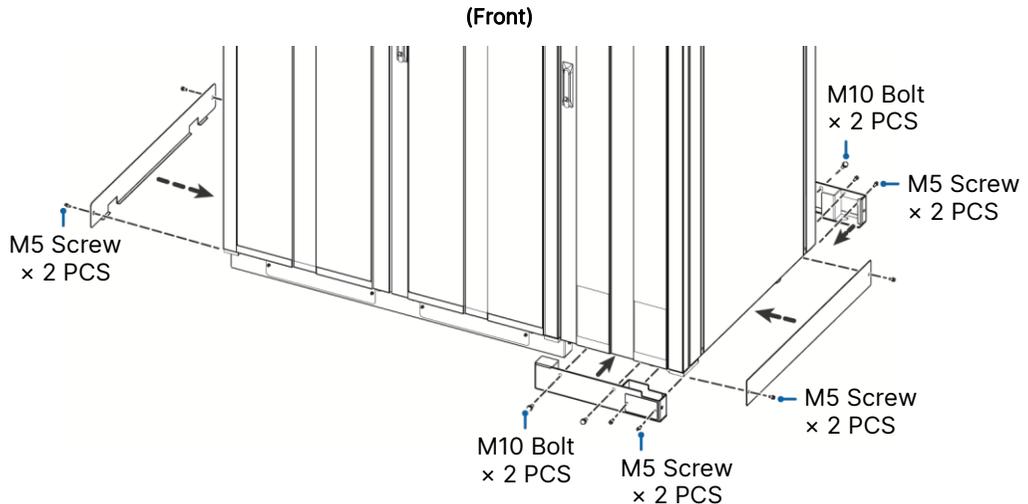


Figure 5-13: Install the Rest of Rodent Shields

**Step 11**

Remove the mini covers of the front and rear rodent shields shown below.

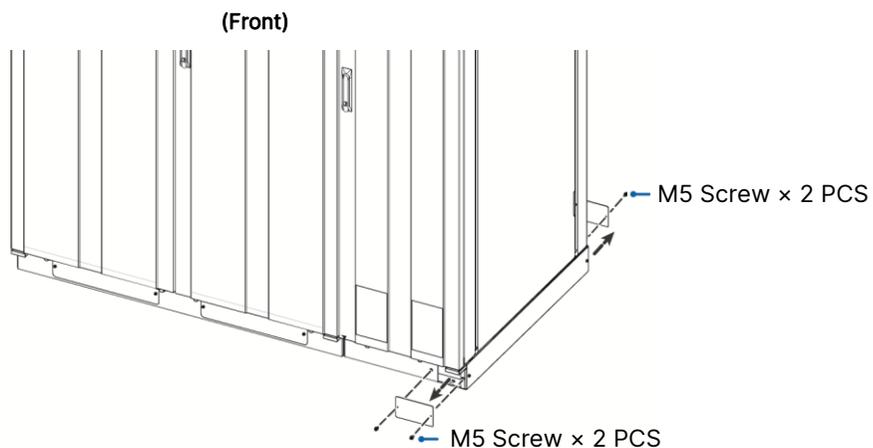
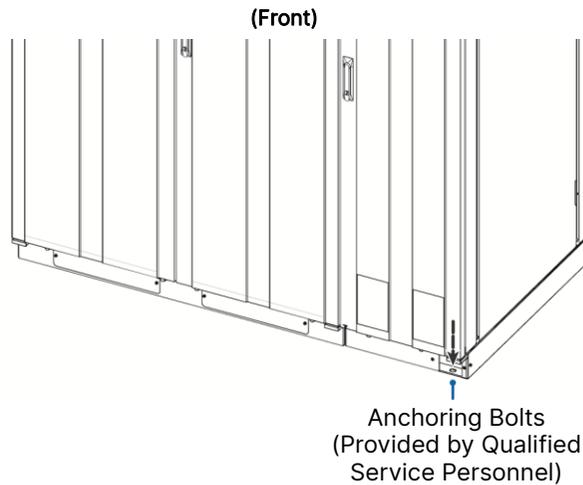


Figure 5-14: Remove the Mini Covers of the Front and Rear Rodent Shields

### **Step 12**

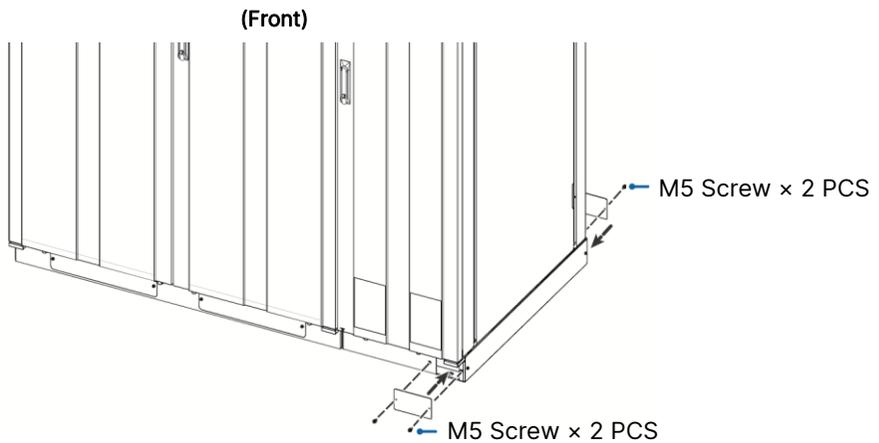
Use the anchoring bolts (provided by qualified service personnel) to mount the front and rear rodent shields on the ground. The following figure only illustrates the front view as an example. Installation methods are the same for the rear side.



**Figure 5-15: Mount the Front and Rear Rodent Shields on the Ground**

### **Step 13**

Reinstall the mini covers removed from the front and rear rodent shields.



**Figure 5-16: Reinstall the Mini Covers of the Front and Rear Rodent Shields**

### **Step 14**

After confirming that wiring and installation of the rodent shields are completed, seal or cover the gaps between the cables and the cabinet to avoid foreign materials falling into the STS.

### **Step 15**

Verify that both inputs to the STS have matched phase sequence. Contact your Delta representative to schedule a startup of the STS.

## 5.5 Wiring

### 5.5.1 Pre-wiring Warnings



**NOTE:**

1. Before wiring, please ensure that the STS is properly installed and mounted in the designated area.
  2. Read section **5.5 Wiring** thoroughly before starting to perform wiring.
  3. When working the unit, please protect the STS from foreign materials falling into the cabinet.
- Before wiring or making any electrical connection, make sure that the power supplied to the input and output of the STS is completely cut off.
  - Check if the size, diameter and phase are correct for each cable connecting to the STS. Please refer to **Table 5-2**.



**NOTE:**

**Table 5-2** is based on the unit of 415V input and 800A output; verify this information with the nameplate of the unit. If there is any discrepancy, please contact your Delta representative.

**Table 5-2: Specifications of Input/ Output Cables & Breakers\*1**

STS Series				
Current Rating			800A	
Input (Source 1 & Source 2)	Rated current at 415V		800A	
	Conductor		Cu	Al
	Recommended cable size	(L1/ L2/ L3/ N)	150 mm <sup>2</sup> × 3 PCS (300 kcmil × 3 PCS)	200 mm <sup>2</sup> × 3 PCS (400 kcmil × 3 PCS)
		PE	70 mm <sup>2</sup> × 1 PC (AWG 2/0 x 1 PC)	100 mm <sup>2</sup> × 1 PC (AWG 4/0 x 1 PC)

STS Series				
Current Rating			800A	
<b>Input (Source 1 &amp; Source 2) (Continued)</b>	Maximum cable size	(L1/ L2/ L3/ N)	250 mm <sup>2</sup> × 3 PCS (500 kcmil × 3 PCS)	250 mm <sup>2</sup> × 3 PCS (500 kcmil × 3 PCS)
		PE	70 mm <sup>2</sup> × 1 PC (AWG 2/0 × 1 PC)	100 mm <sup>2</sup> × 1 PC (AWG 4/0 × 1 PC)
	Maximum cable lug width		44.2 mm (1.74")	
	Screw size/ Cable lug inner diameter		M12/ 14 mm (0.55")	
	Terminal type		Panduit Pan-Lug™ LCMC300-12-6 Comp. Lug or equal.	
<b>Output</b>	Rated current		800A	
	Conductor		Cu	Al
	Recommended cable size	(L1/ L2/ L3/ N)	150 mm <sup>2</sup> × 3 PCS (300 kcmil × 3 PCS)	200 mm <sup>2</sup> × 3 PCS (400 kcmil × 3 PCS)
		PE	70 mm <sup>2</sup> × 1 PC (AWG 2/0 × 1 PC)	100 mm <sup>2</sup> × 1 PC (AWG 4/0 × 1 PC)
	Maximum cable size	(L1/ L2/ L3/ N)	250 mm <sup>2</sup> × 3 PCS (500 kcmil × 3 PCS)	250 mm <sup>2</sup> × 3 PCS (500 kcmil × 3 PCS)
		PE	70 mm <sup>2</sup> × 1 PC (AWG 2/0 × 1 PC)	100 mm <sup>2</sup> × 1 PC (AWG 4/0 × 1 PC)
	Maximum cable lug width		44.2 mm (1.74")	
	Screw size/ Cable lug inner diameter		M12/ 14 mm (0.55")	
	Terminal type		Panduit Pan-Lug™ LCMC300-12-6 Comp. Lug or equal.	
<b>Tightening Torque</b>			M12 = 500 ± 20 kgf-cm (433.98 ± 17.36 lb-in)	

STS Series	
Current Rating	800A
Input Breaker* <sup>1</sup> (CB1)	800A
Input Breaker* <sup>1</sup> (CB2)	800A
Bypass Breaker* <sup>1</sup> (CB4)	800A
Bypass Breaker* <sup>1</sup> (CB5)	800A
Output Breaker* <sup>1</sup> (CB3A)	800A
Output Breaker* <sup>1</sup> (CB3B)	800A

**NOTE:**

1. Please follow National Electrical Code (NEC) and local regulations for proper conduits, bushings, cable sizing and protective devices.
  2. When wiring, use copper or aluminum conductors. For cables, the suggested minimum rated temperature for heat resistance is 90°C (194°F).
  3. \*<sup>1</sup> Breaker(s) might be changed to switch(es) and quantity might be varied according to different models' applications. In this user manual, the wording 'breaker(s)' means breaker(s) or switch(es).
- The two input sources must match the phase sequence.
  - The STS's PE terminal (⊕) must be grounded (see *Figure 2-6*). Please use ring-type terminals when wiring.

**WARNING:**

Wrong wiring will cause damage to the STS and electric shock.

## 5.5.2 Wiring Procedures

**NOTE:**

Before wiring, ensure that every breaker is in the **OFF** position, read *5.5 Wiring* thoroughly and make sure that relevant conditions have been met.

### Step 1

The STS only allows cable entry from the bottom. Please leave adequate space at the bottom to allow cable entry.

### Step 2

Refer to *Table 5-3* for information about the wiring terminals.

**Table 5-3: STS's Wiring Terminals & Wiring Information**

No.	Item	Description
1	Source 1 Input Terminals (L1/ L2/ L3/ N)	Connect the terminals to the preferred or alternate source according to your settings on the LCD.
2	Source 2 Input Terminals (L1/ L2/ L3/ N)	Connect the terminals to the preferred or alternate source according to your settings on the LCD.
3	Output Terminals (L1/ L2/ L3/ N)	Connect the terminals to the critical loads.
4	 PE (protective earth) Terminal	It is protective earthing for protection against electrical shock in case of fault*1. The terminal must be connected to the main earth.
5	 GND (ground) Terminals	The terminals are used to ground the devices which are associated with STS operation.



**NOTE:**

\*1 The PE (protective earth) connection ensures that all exposed conductive surfaces are at the same electric potential as the Earth to avoid the risk of electrical shock due to leakage current or an insulation fault.

**Step 3**

Make sure that all breakers are in the **OFF** position.

**Step 4**

Follow *Table 5-2* to select proper input and output cables. To properly connect the cables to the STS, please follow the figure below to install the provided M12 bolts, flat washers, Belleville washers and M12 nuts. The usage of suitable conduits for input and output wiring is suggested.

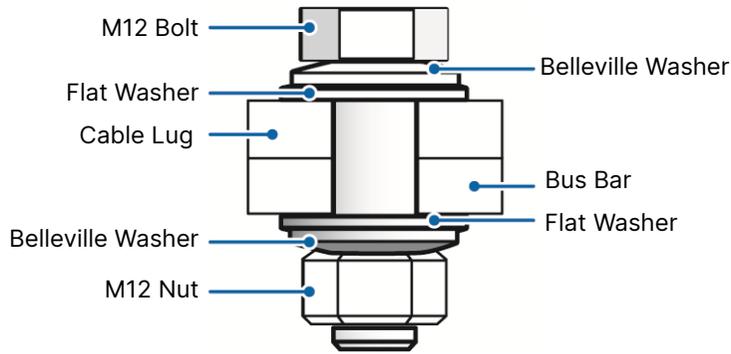
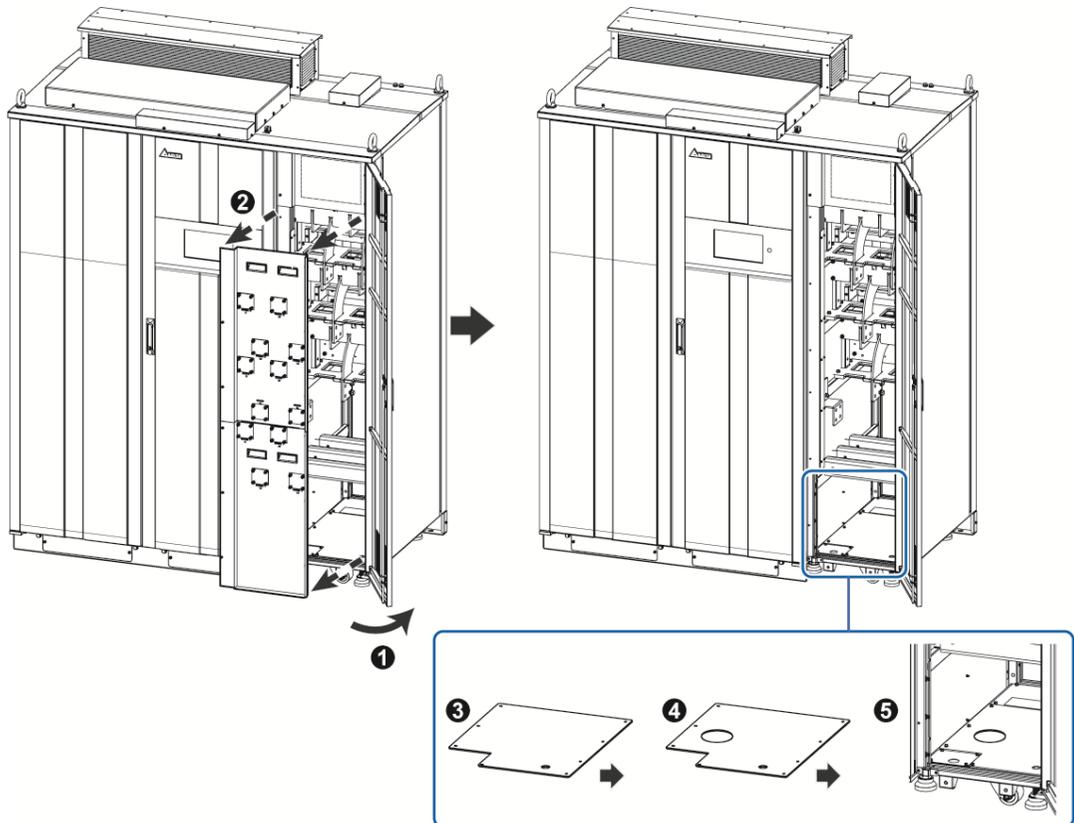
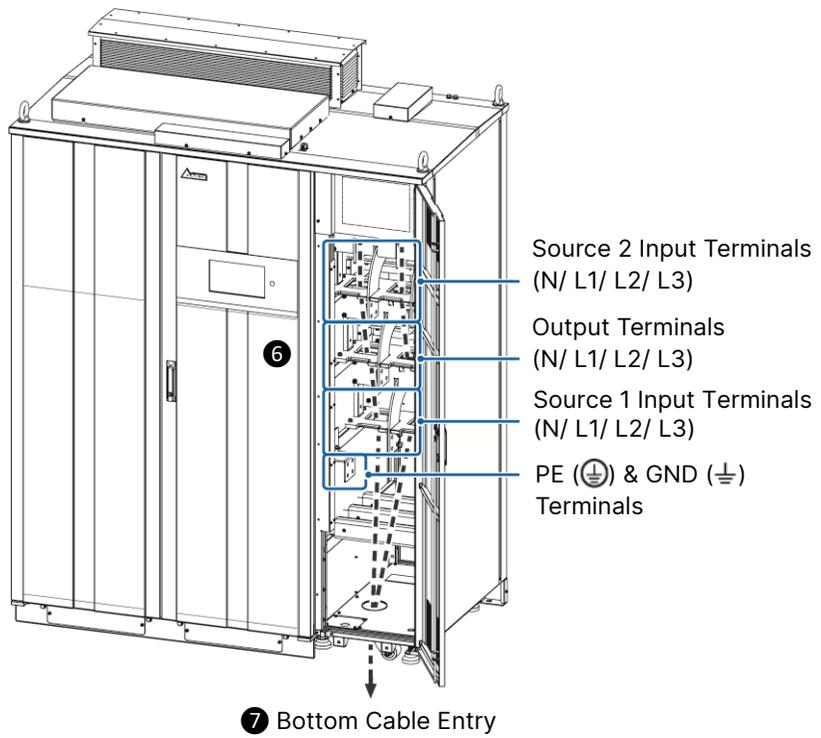


Figure 5-17: Installation of the Provided M12 Bolts, Flat Washers, Belleville Washers & M12 Nuts

### Step 5

**ONLY** bottom cable entry is allowed. ① open the right cabinet's front door, ② remove the two wiring covers, ③ take out the bottom cover, ④ follow on-site requirements to perform machining on the bottom cover (please follow National Electrical Code (NEC) and local regulations for proper conduits, bushings and cable sizing), ⑤ re-install the bottom cover, ⑥ connect the cables to the source 1 input, source 2 input, output, PE (⊕) & GND (⊖) terminals and ⑦ route the cables through the bottom cover.





**Figure 5-18: Bottom Cable Entry for the Wiring Terminals**

## Chapter 6 : STS Operation



### NOTE:

1. All LCD diagrams in the user manual are for reference only. The display is subject to the actual status of the STS.
2. For information about the LCD touch panel and tri-color LED indicator, please refer to *2.8 Tri-color LED Indicator & Buzzer* and *7. LCD Display & Settings*.
3. Breaker(s) might be changed to switch(es) and quantity might be varied according to different models' applications. In this user manual, the wording 'breaker(s)' means breaker(s) or switch(es).

### 6.1 Turn-on Procedures



### WARNING:

Do not operate the STS before startup and commissioning are completed by Delta engineers or Delta's approved service partners.

#### Step 1

Make sure that all breakers are in the **OFF** position.

#### Step 2

Energize the two input power sources. After connection, the STS comes on automatically.

#### Step 3

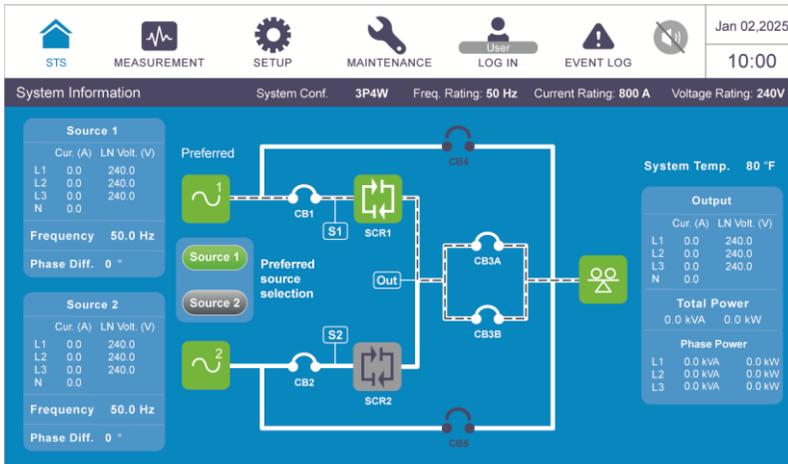
Check the display to confirm that the STS has no issue before proceeding to the next step.

#### Step 4

Turn **ON** the Output Breakers (CB3A & CB3B) to ensure that the STS can execute the soft-start process.

#### Step 5

Turn **ON** the Input Breakers (CB1 & CB2). After that, the STS starts supplying power to the loads.



## 6.2 Turn-off Procedures

### Step 1

Turn **OFF** the critical loads connected to the STS.

### Step 2

Turn **OFF** the Output Breakers (CB3A & CB3B).

### Step 3

Turn **OFF** the Input Breakers (CB1 & CB2).

### Step 4

De-energize the two input power sources (no need to remove the cables). After that, the LCD will be off.

### 6.3 Manual Bypass Procedures



**WARNING:**

The manual bypass procedures mentioned below must be followed to avoid a potential safety hazard to personnel and the STS.

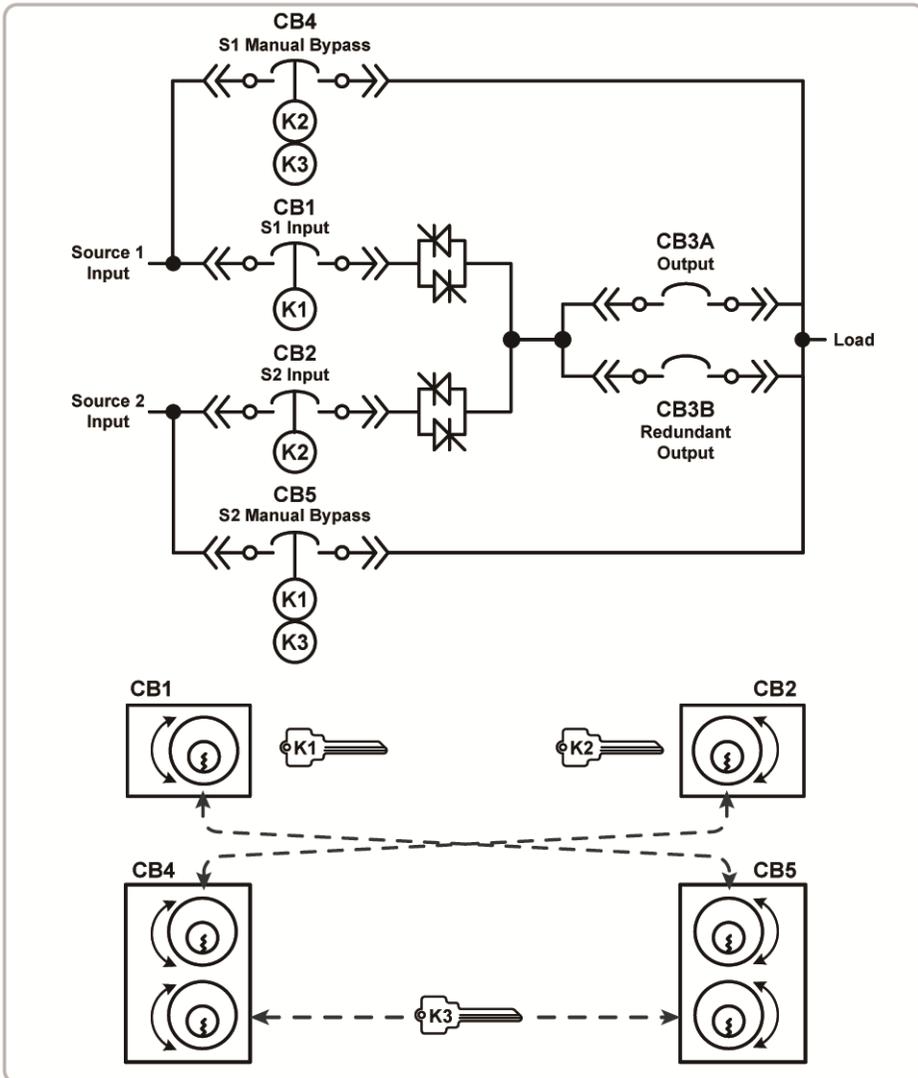


Figure 6-1: STS One-line Diagram & Kirk-key Interlock Operation

## 6.3.1 Manual Bypass Procedures for Source 1



### NOTE:

When performing the following procedures, please refer to the kirk-key interlock layout shown in *Figure 6-1*.

- To bypass source 1:

#### Step 1

Tap the touch screen to wake up the display and verify that source 1 is the preferred source.

#### Step 2

Move the interlock key K3 (A3) from the CB5 interlock to CB4 interlock.

#### Step 3

Turn **OFF** source 2's Input Breaker (CB2).

#### Step 4

Rotate and remove the interlock key K2 (B1) from the CB2 interlock.

#### Step 5

Insert the interlock key K2 (B1) into the CB4 interlock to retract the interlock.

#### Step 6

Turn **ON** the Bypass Breaker (CB4).

#### Step 7

Verify that the status of the Bypass Breaker (CB4) is closed on the display.

#### Step 8

Turn **OFF** the two Output Breakers (CB3A & CB3B).

#### Step 9

Turn **OFF** the Input Breaker (CB1) and rotate the interlock key K1 (A1) to lock out the breaker.

#### Step 10

Secure the key according to on-site LOTO procedures.

#### Step 11

(1) Take out the following fuses in sequence:

Source 2 SPD fuses → source 1 SPD fuses → output auxiliary power fuses → source 2 auxiliary power fuses → source 1 auxiliary power fuses (see *Figure 2-4* for the location of fuses).

(2) Turn **OFF** the redundant fan breakers and main fan breakers in order (see *Figure 2-4* for the location of breakers).

(3) After that, the LCD will be off.

- **To return to normal mode:**

#### **Step 1**

(1) Turn **ON** the main fan breakers and redundant fan breakers in order (see *Figure 2-4* for the location of breakers).

(2) Re-install the following removed fuses in sequence:

Source 1 auxiliary power fuses → source 2 auxiliary power fuses → output auxiliary power fuses → source 1 SPD fuses → source 2 auxiliary power fuses (see *Figure 2-4* for the location of fuses).

(3) After that, the LCD will be on.

#### **Step 2**

Check the LCD to verify that the Bypass Breaker (CB4) is the only breaker closed.

#### **Step 3**

Insert the interlock key K1 (A1) into the CB1 interlock to retract the interlock.

#### **Step 4**

Turn **ON** the source 1's Input Breaker (CB1).

#### **Step 5**

Verify that the Input Breaker (CB1) is closed and the SCR 1 energizes on the display.

#### **Step 6**

Turn **ON** the two Output Breakers (CB3A & CB3B).

#### **Step 7**

Verify that the two Output Breakers (CB3A & CB3B) are closed on the display.

#### **Step 8**

Turn **OFF** the Bypass Breaker (CB4) and rotate the interlock key K2 (B1) to lock the breaker.

#### **Step 9**

Remove the interlock key K2 (B1) from the CB4 interlock.

#### **Step 10**

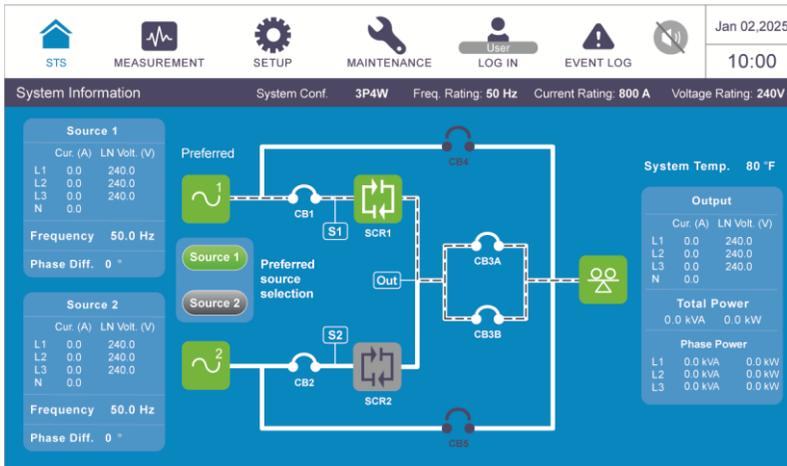
Insert the interlock key K2 (B1) into the CB2 interlock and retract the interlock.

#### **Step 11**

Turn **ON** the Input Breaker (CB2) breaker.

## Step 12

Check the status of source 2 and CB2 on the display. If everything is correct, the LCD will show as follows.



## 6.3.2 Manual Bypass Procedures for Source 2



### NOTE:

When performing the following procedures, please refer to the kirk-key interlock layout shown in *Figure 6-1*.

- To bypass source 2:

### Step 1

Tap the touch screen to wake up the display and verify that source 2 is the preferred source.

### Step 2

Move the interlock key K3 (A3) from the CB4 interlock to CB5 interlock.

### Step 3

Turn OFF source 1's Input Breaker (CB1).

### Step 4

Rotate and remove the interlock key K1 (A1) from the CB1 interlock.

### Step 5

Insert the interlock key K1 (A1) into the CB5 interlock to retract the interlock.

### Step 6

Turn ON the Bypass Breaker (CB5).

**Step 7**

Verify that the status of the Bypass Breaker (CB5) is closed on the display.

**Step 8**

Turn **OFF** the two Output Breakers (CB3A & CB3B).

**Step 9**

Turn **OFF** the Input Breaker (CB2) and rotate the interlock key K2 (B1) to lock out the breaker.

**Step 10**

Secure the key according to on-site LOTO procedures.

**Step 11**

(1) Take out the following fuses in sequence:

Source 2 SPD fuses → source 1 SPD fuses → output auxiliary power fuses → source 2 auxiliary power fuses → source 1 auxiliary power fuses (see *Figure 2-4* for the location of fuses).

(2) Turn **OFF** the redundant fan breakers and main fan breakers in order (see *Figure 2-4* for the location of breakers).

(3) After that, the LCD will be off.

- **To return to normal mode:**

**Step 1**

(1) Turn **ON** the main fan breakers and redundant fan breakers in order (see *Figure 2-4* for the location of breakers).

(2) Re-install the following removed fuses in sequence:

Source 1 auxiliary power fuses → source 2 auxiliary power fuses → output auxiliary power fuses → source 1 SPD fuses → source 2 auxiliary power fuses (see *Figure 2-4* for the location of fuses).

(3) After that, the LCD will be on.

**Step 2**

Check the LCD to verify that the Bypass Breaker (CB5) is the only breaker closed.

**Step 3**

Insert the interlock key K2 (B1) into the CB2 interlock to retract the interlock.

**Step 4**

Turn **ON** source 2's Input Breaker (CB2).

### Step 5

Verify that the Input Breaker (CB2) is closed and SCR 2 energizes on the display.

### Step 6

Turn **ON** the two Output Breakers (CB3A & CB3B).

### Step 7

Verify that the two Output Breakers (CB3A & CB3B) are closed on the display.

### Step 8

Turn **OFF** the Bypass Breaker (CB5) and rotate the interlock key K1 (A1) to lock the breaker.

### Step 9

Remove the interlock key K1 (A1) from the CB5 interlock.

### Step 10

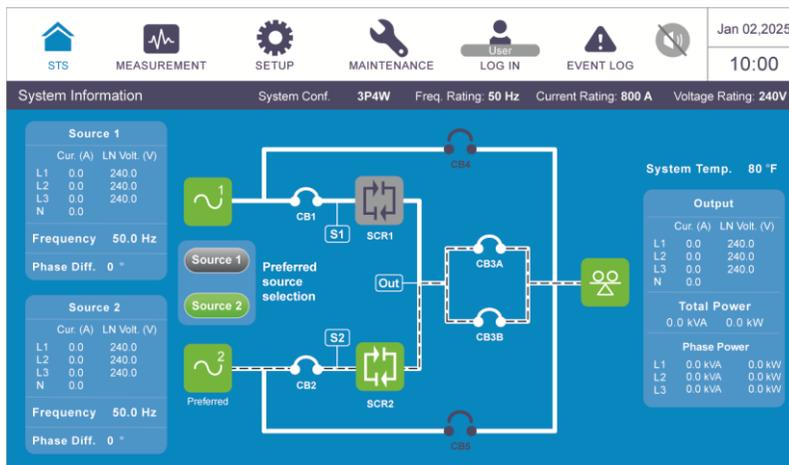
Insert the interlock key K1 (A1) into the CB1 interlock and retract the interlock.

### Step 11

Turn **ON** the Input Breaker (CB1) breaker.

### Step 12

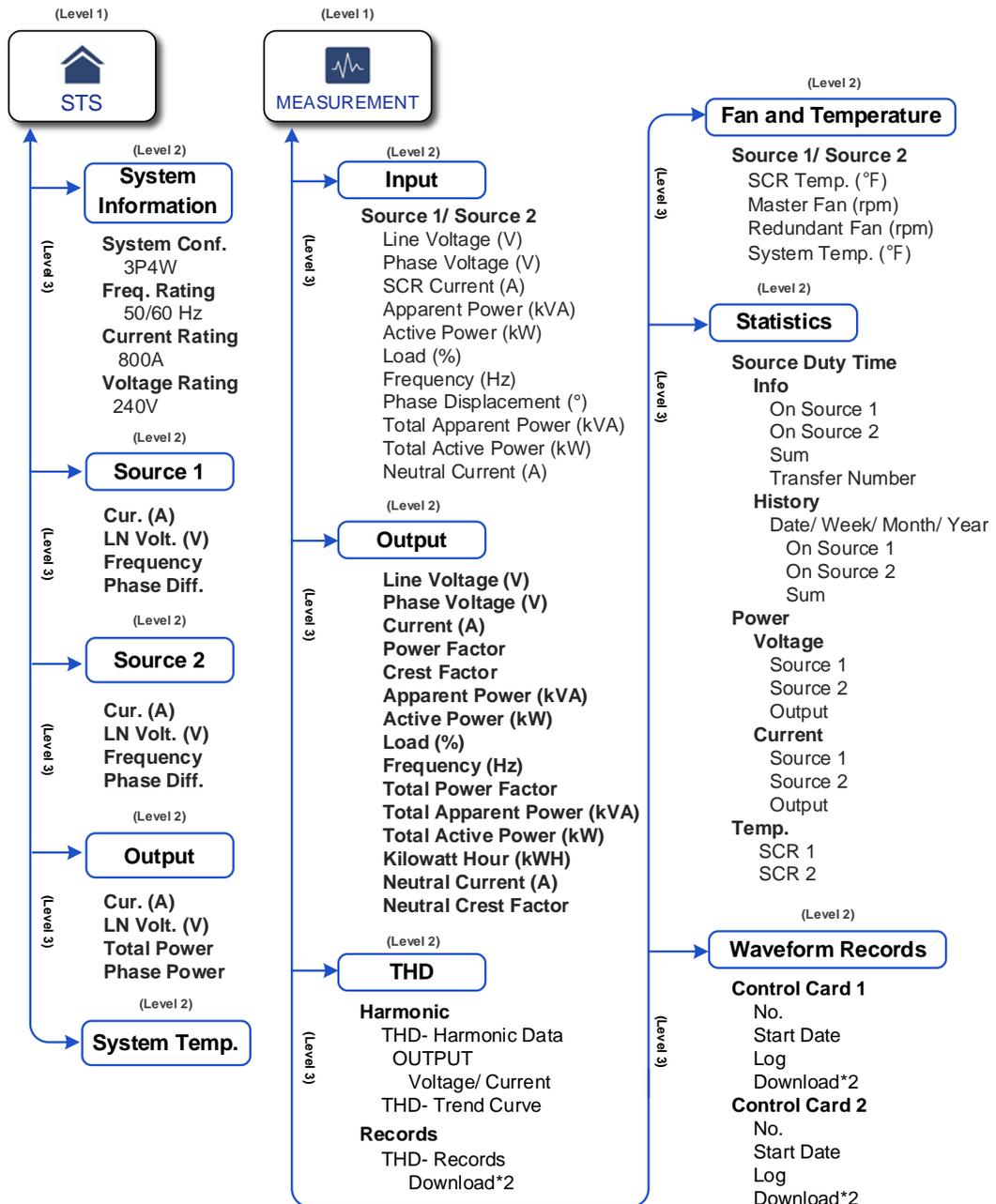
Check the statuses of source 1 and CB1 on the display. If everything is correct, the LCD will show as follows.

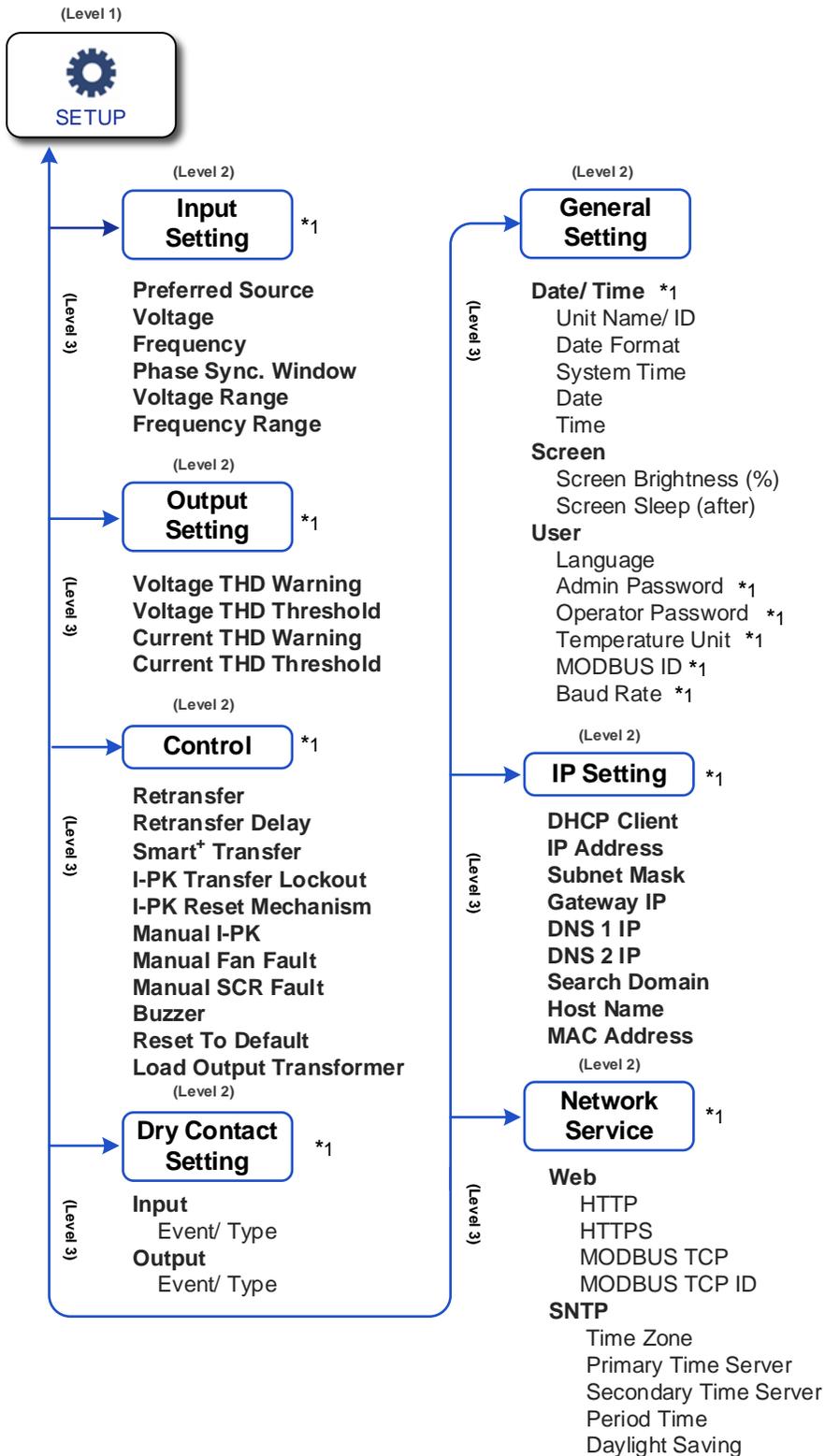


# Chapter 7 : LCD Display & Settings

## 7.1 LCD Display Hierarchy

Please refer to *Figure 7-1* for an overview of all the LCD items. For some of the items marked with an asterisk, they will show up only under certain conditions. Please refer to the note below for more details.





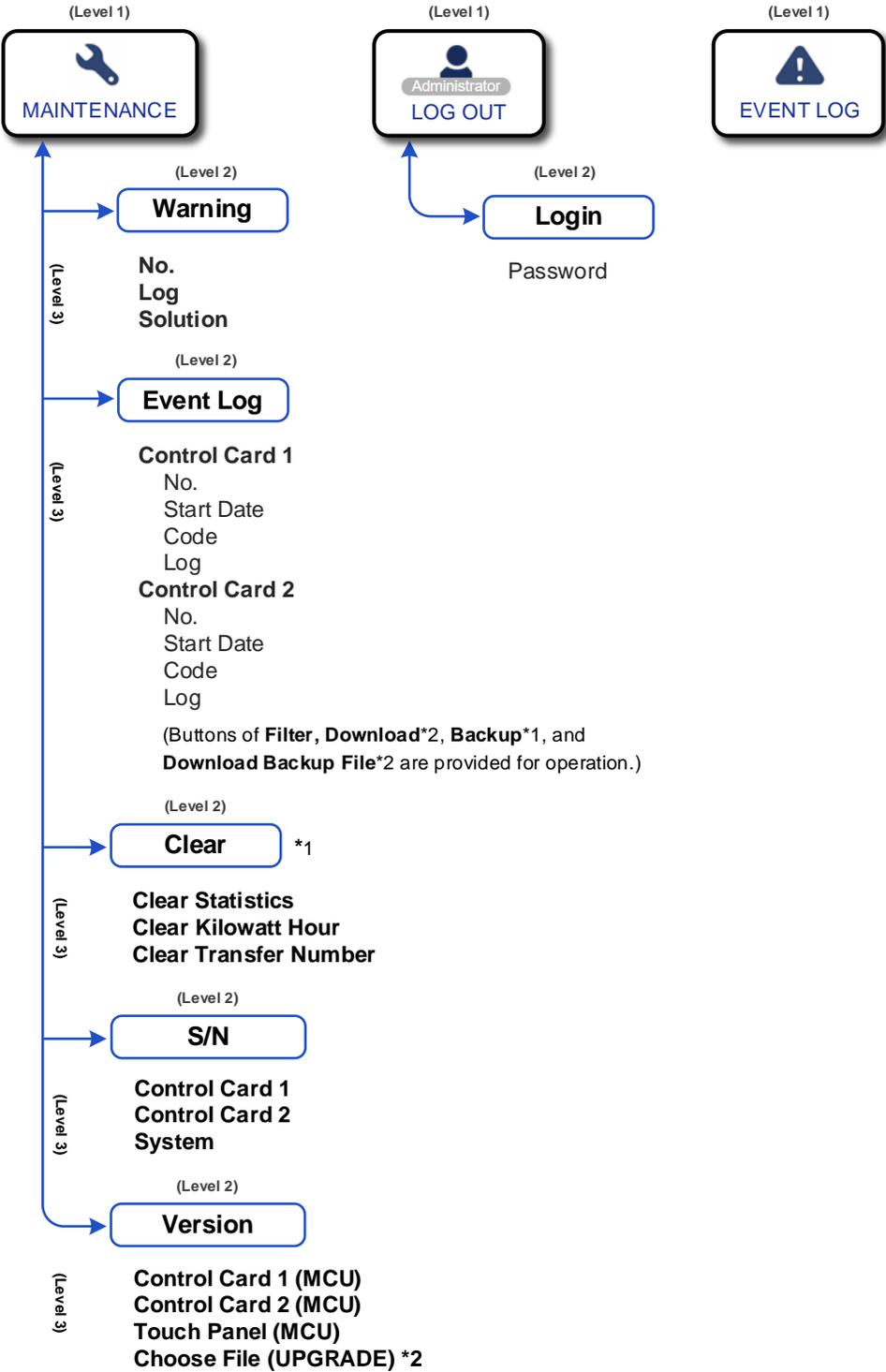


Figure 7-1: LCD Display Hierarchy



### NOTE:

- \*1 To display the item, you have to log in as **Administrator**. Please refer to **7.4 Password Entry**.
- \*2 The button will show up only after you are logged in as **Administrator** and connect a user-supplied USB flash drive to the USB port (see **Figure 4-9**).
- The LCD screen diagrams in the user manual are for reference only. The actual display depends on the operation situation.

## 7.2 How to Turn on the LCD

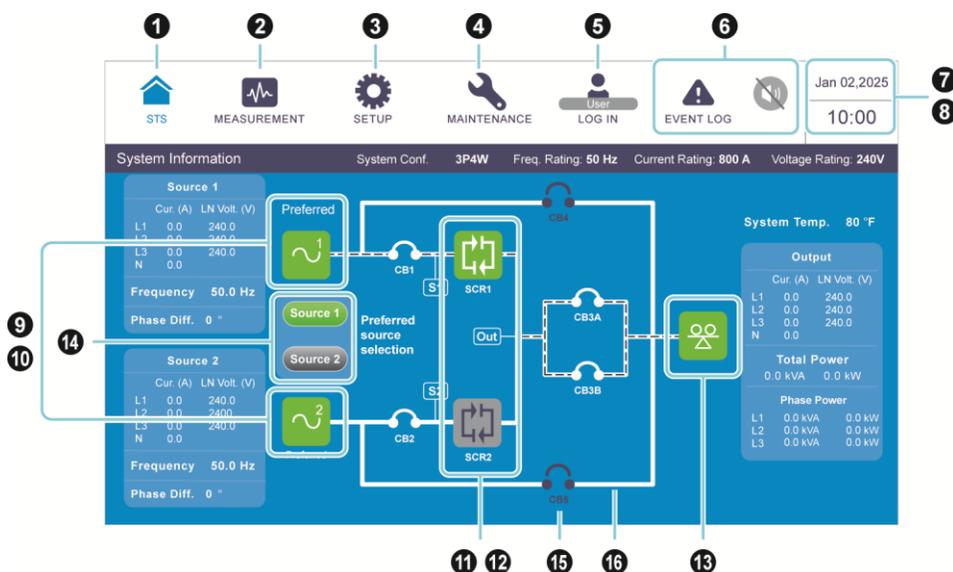
After connecting the input power source(s), the LCD will be on.

## 7.3 Introduction of Touch Panel and Function Keys



### NOTE:

Since the breaker(s) might be changed to switch(es) and quantity might be varied according to different models' applications, the CB1, CB2, CB3A, CB3B, CB4 and CB5 shown on the LCD might be varied due to model difference.



No.	Icon/ Text	Button Function (Yes or No)	Text/ Digital Display (Yes or No)	Symbol Display (Yes or No)	Description
1		✓	✓		Tap the button to go back to the <b>Main Screen</b> . The name ( <b>STS</b> ) below the icon (  ) can be changed; please go to  → <b>General Setting</b> → <b>Unit Name/ ID</b> .
2		✓			Tap the button to open the measurement menu. For the menu items, refer to <b>Figure 7-1</b> .
3		✓			Tap the button to open the setup menu. For the menu items, refer to <b>Figure 7-1</b> . For details, refer to <b>7.6 STS Settings</b> .
4		✓			Tap the button to open the maintenance menu. For the menu items, refer to <b>Figure 7-1</b> . For details, refer to <b>7.7 System Maintenance</b> .
5		✓		✓	It indicates <b>User</b> login status. Tap the icon to change the login permission. Please refer to <b>7.4 Password Entry</b> .
		✓		✓	It indicates <b>Administrator login status</b> . Tap the icon to change the login permission. Please refer to <b>7.4 Password Entry</b> .

No.	Icon/ Text	Button Function (Yes or No)	Text/ Digital Display (Yes or No)	Symbol Display (Yes or No)	Description
6	 EVENT LOG	✓		✓	<ol style="list-style-type: none"> <li>Historical event screen shortcut button (). <small>EVENT LOG</small></li> <li>When the icon is blue () , it means there is no warning event.</li> </ol>
	 WARNING  WARNING	✓	✓	✓	<ol style="list-style-type: none"> <li>Warning screen shortcut button (<sup>2</sup>) &amp; buzzer icon ().</li> <li>When the icon is red () , it indicates that there is a warning event. At this time, the buzzer will sound and the buzzer icon will appear in red (). The numerical value at the upper right of the icon (<sup>2</sup>) indicates the total number of the warning events.  To mute the buzzer, tap the icon () , and the icon will become gray (). If there is any new warning event happening afterwards, the buzzer will sound and the icon () will appear and light up again.</li> </ol>
7	Jan 02,2025		✓		It indicates the date.
8	10:00		✓		It indicates the time.

No.	Icon/ Text	Button Function (Yes or No)	Text/ Digital Display (Yes or No)	Symbol Display (Yes or No)	Description
9				✓	It indicates source 1 status (Green: Normal / Red: Abnormal/ Yellow: Unknown Status). If the source 1 is set as the preferred source, the text <b>'Preferred'</b> will appear above the icon.
10				✓	It indicates source 2 status (Green: Normal / Red: Abnormal/ Yellow: Unknown Status). If the source 2 is set as the preferred source, the text <b>'Preferred'</b> will appear above the icon.
11				✓	It indicates SCR 1 status (Green: ON/ Gray: OFF/ Red: Fault).
12				✓	It indicates SCR 2 status (Green: ON/ Gray: OFF/ Red: Fault).
13				✓	It indicates output status (Green: Output/ Red: No Output/ Yellow: Unknown Status).
14		✓		✓	It indicates the preferred and alternate sources (Green: Preferred Source/ Gray: Alternate Source).
15				✓	It indicates the breaker's status.  : Off  : On (De-energized)  : On (Energized & Source Normal)  : On (Energized & Source Abnormal)  : On (Unknown Status)

No.	Icon/ Text	Button Function (Yes or No)	Text/ Digital Display (Yes or No)	Symbol Display (Yes or No)	Description
16				✓	It indicates the current status.  : De-energized  : Energized & Power Flow  : Energized  : Energized & Source Abnormal  : Unknown Status

Other icons on the touch panel are shown in the table below.

No.	Icon	Function
1		It goes to the top page.
2		It goes to the last page.
3		It moves up.
		
4		It moves down.
		
5		It goes to the previous page.
		
6		It goes to the next page.
		
7		Increase
8		Decrease

No.	Icon	Function
9		<ol style="list-style-type: none"> <li>1. It indicates the page no.</li> <li>2. It goes to a specific page according to the no. you key in.</li> </ol>
10		Delete
		
11		Capital
12		Space

**NOTE:**

1. After the backlight is turned off, you can tap the LCD to return to the **Main Screen**.
2. The sleep time for the backlight can be adjusted. Please go to  → **General Setting** → **Screen** → **Screen Sleep (after)**.
3. If you are logged in as **Administrator**, you will be logged out when the backlight is off. Tap to wake up the LCD screen, and it will go back to the **Main Screen** in the **User** login status. Even if you set up the backlight in '**Never Sleep**' mode, you will still be logged out after the screen is idle for 5 minutes.
4. The default language is English, which differs according to countries. To change the display language, please go to  → **General Setting** → **User** → **Language**.

## 7.4 Password Entry

1. **Administrator** login requires a password while **User** login does not.
2. Tap  → enter the **Administrator** password (contact service personnel for the default password) → the icon  appears, indicating the **Administrator** login is successful.
3. To change the **Administrator** password, please go to  → **General Setting** → **User** → **Admin Password** (4 digits).

## 7.5 Measurement

The **Measurement** menu includes information about **Input**, **Output**, **THD**, **Fan and Temperature**, **Statistics** and **Waveform Records**. Please refer to the following sections for details.

### 7.5.1 Input

Path:  → Input

Item	Description
Line Voltage (V)	It shows the input line voltage.
Phase Voltage (V)	It shows the input phase voltage.
SCR Current (A)	It shows the input SCR current.
Apparent Power (kVA)	It shows the input apparent power.
Active Power (kW)	It shows the input active power.
Load (%)	It shows the load percentage.
Frequency (Hz)	It shows the input frequency.
Phase Displacement (°)	It shows the input source phase difference.
Total Apparent Power (kVA)	It shows the total input apparent power.
Total Active Power (kW)	It shows the total input active power.
Neutral Current (A)	It shows the input neutral current.

## 7.5.2 Output

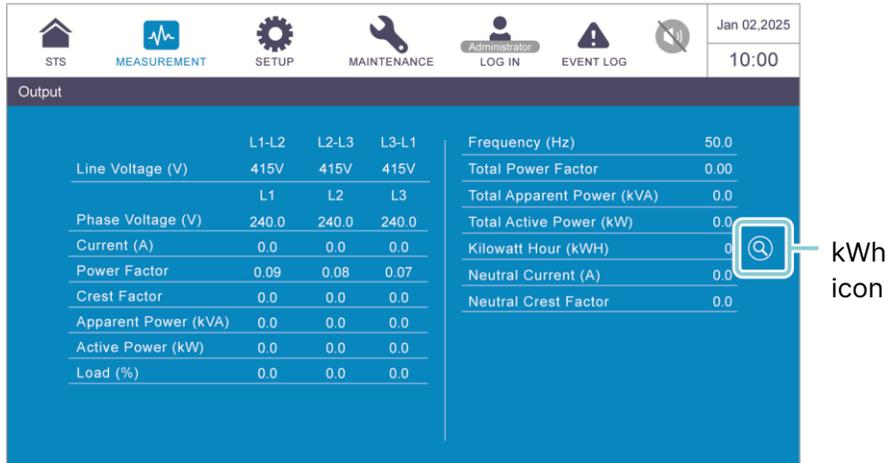
Path:  → Output

Item	Description
Line Voltage (V)	It shows the output line voltage.
Phase Voltage (V)	It shows the output phase voltage.
Current (A)	It shows the output current.
Power Factor	It shows the output power factor.
Crest Factor	It shows the output crest factor.
Apparent Power (kVA)	It shows the output apparent power.
Active Power (kW)	It shows the output active power.
Load (%)	It shows the load percentage.
Frequency (Hz)	It shows the output frequency.
Total Power Factor	It shows the total output power factor.
Total Apparent Power (kVA)	It shows the total output apparent power.
Total Active Power (kW)	It shows the total output active power.
Kilowatt Hour (kWH)	Please refer to <i>7.5.2.1 Check Kilowatt-Hour.</i>
Neutral Current (A)	It shows the output neutral current.
Neutral Crest Factor	It shows the output neutral crest factor.

## 7.5.2.1 Check Kilowatt-Hour

Path:  → Output → kWh Icon 

Tap the kWh icon  to check the STS's output kWh statistics in the following window.



No.	Item	Description
1	Sheet Tabs (Day/ Week/ Month/ Year/ Since Reset)	Tap the sheet tabs to view the kWh statistics and column charts of different time scales.

No.	Item	Description
②	Column Chart	<ol style="list-style-type: none"> <li>1. It shows the STS's output kWh statistics, with time on X-axis and kWh on Y-axis.</li> <li>2. Tap the column on the chart, and the corresponding piece of data will appear below the chart.</li> </ol>
③	Search Tick Setup Icon 	Tap  , and you can set the date and time for the 'Search Tick' to view the corresponding column chart.
④	Search Tick	It shows the date and time that has been set via  .
⑤	Tick Unit	The time unit for the X-axis. It can be Hour, Day or Week.
⑥	Present/ Peak/ Low/ Sum (kWh/ d)	Regardless of which kWh statistic sheet you choose, the four items indicate today's statistics: the present value/ the highest value (so far)/ the lowest value (so far)/ the sum (so far).
⑦	Last Reset Date	The last date when 'Clear Kilowatt Hour' was executed.

### 7.5.3 THD

Path:  → THD

Item	Description
Harmonic	It shows the current and the latest six hours' total output harmonic data (including voltage and current).
Records	<p>It shows the THD records when any of the following situations occurs.</p> <ol style="list-style-type: none"> <li>1. Power source transfers between source 1 and source 2.</li> <li>2. Output voltage is abnormal.</li> <li>3. THD is abnormal.</li> <li>4. Whenever the STS starts up.</li> </ol>

## 7.5.4 Fan and Temperature

Path:  → Fan and Temperature

Item	Sub Item	Description
Source1/ Source 2	SCR Temp. (°C)	It shows the SCR modules' temperature.
	Master Fan (rpm)	It shows each master fan's temperature.
	Redundant Fan (rpm)	It shows each redundant fan's temperature.
	System Temp. (°C)	It shows the system temperature.

## 7.5.5 Statistics

Path:  → Statistics

Item	Sub Item		Description
Source Duty Time	Info.	On Source 1	How long source 1 has supplied power to the loads.
		On Source 2	How long source 2 has supplied power to the loads.
		Sum	How long source 1 and source 2 have supplied power to the loads.
		Transfer Number	How many times transfer between source 1 and source 2 have occurred
	History (Date/ Week/ Month/ Year)	On Source 1	How long source 1 has supplied power to the loads in different time scales.
		On Source 2	How long source 2 has supplied power to the loads in different time scales.
		Sum	How long source 1 and source 2 have supplied power to the loads in different time scales.

Item	Sub Item		Description
Power	Voltage	Source 1	It shows the voltage of source 1 in different time scales.
		Source 2	It shows the voltage of source 2 in different time scales.
		Output	It shows the output voltage in different time scales.
	Current	Source 1	It shows the current of source 1 in different time scales.
		Source 2	It shows the current of source 2 in different time scales.
		Output	It shows the output current in different time scales.
Temp.	SCR 1		It shows the temperature of SCR 1 in different time scales.
	SCR 2		It shows the temperature of SCR 2 temperature in different time scales.

To clear the statistics, please refer to **7.7.3 Clear**.

## 7.5.6 Waveform Records

Path:  → Waveform Records

Item	Description
Control Card 1	It shows the control card 1's waveform records.
Control Card 2	It shows the control card 2's waveform records.

## 7.6 STS Settings

This chapter lists all the STS setting items for your reference. Some items will show up only under certain conditions. Please refer to **7.1 LCD Display Hierarchy** for details.

## 7.6.1 Input Setting

Path:  → Input Setting

Item	Description
Preferred Source	Set up source 1 or source 2 as the preferred source.
Voltage	Set up source 1 and source 2's nominal voltage.
Frequency	Set up source 1 and source 2's nominal frequency.
Phase Sync. Window	Set up the phase synchronization's range.
Voltage Range ( $\pm$ %)	Set up source 1 and source 2's voltage range.
Frequency Range	Set up source 1 and source 2's frequency range.

## 7.6.2 Output Setting

Path:  → Output Setting

Item	Description
Voltage THD Warning	Enable or disable the voltage THD warning.
Voltage THD Threshold	Set up the voltage THD threshold.
Current THD Warning	Enable or disable the current THD warning.
Current THD Threshold	Set up the current THD threshold.

## 7.6.3 Control

Path:  → Control

Item	Description
Retransfer	Enable or disable the power source retransfer function.
Retransfer Delay	Set up the retransfer delay time.
Smart+ Transfer	Enable or disable the smart+ transfer function.
I-PK Transfer Lockout	Set up the output current's threshold.
I-PK Reset Mechanism	Clear the alarm message ( <b>S1 I-Peak Over/ S2 I-Peak Over</b> ) automatically or manually.

Item	Description
Manual I-PK	Clear the alarm message (S1 I-Peak Over/ S2 I-Peak Over).
Manual Fan Fault	Clear the alarm message (Manual Fan Fault).
Manual SCR Fault	Clear the alarm message (Manual SCR Fault).
Buzzer	Enable or disable the buzzer.
Reset to Default	Reset the STS to the factory default settings.
Load Output Transformer	<ol style="list-style-type: none"> <li>1. Select '<b>Delta</b>' if the output transformer is Delta-connection type.</li> <li>2. Select '<b>Wye</b>' if the output transformer is Y-connection type.</li> </ol>

#### 7.6.4 Dry Contact Setting

Path:  SETUP → Dry Contact Setting → Input/ Output

Input Dry Contact No.	Event Selection	Type
Input Dry Contact 1 Input Dry Contact 2 Input Dry Contact 3 Input Dry Contact 4	<ol style="list-style-type: none"> <li>1. None</li> <li>2. Preferred Source</li> <li>3. Transfer Inhibited</li> </ol>	Set up NO (normally open) or NC (normally closed) for each input dry contact.

Output Dry Contact No.	Event Selection	Type
Output Dry Contact 1 Output Dry Contact 2 Output Dry Contact 3 Output Dry Contact 4 Output Dry Contact 5 Output Dry Contact 6	<ol style="list-style-type: none"> <li>1. None</li> <li>2. S1 Fail</li> <li>3. S2 Fail</li> <li>4. Bypass CB4 Is Closed &amp; S1 Is Bypassed</li> <li>5. Bypass CB5 Is Closed &amp; S2 Is Bypassed</li> <li>6. Load on S1</li> <li>7. Load on S2</li> <li>8. Transfer Inhibited</li> <li>9. Over Temperature</li> <li>10. Summary Alarm</li> </ol>	Set up NO (normally open) or NC (normally closed) for each output dry contact.

## 7.6.5 General Setting

Path:  → General Setting

Item	Sub Item	Description
Date/ Time	Unit Name/ ID	Set up the unit's name or ID.
	Date Format	Select the date format.
	Date	Set up the date.
	System Time	Set up the system time.
	Time	Set up the time.
Screen	Screen Brightness (%)	Adjust the LCD display brightness (default: 80).
	Screen Sleep (after)	Set up the LCD backlight sleep time (default: 1 minute).
User	Language	Set up the display language (default: English).
	Admin Password	Set up the administrator password (4 digits).
	Operator Password	Set up the operator password (4 digits).  <b>NOTE:</b> If you are logged in as <b>User</b> , you will be required to key in the operator password when you tab the source icon (  /  ) or buzzer icon (  /  ).
	Temperature Unit	Set up the temperature unit (Celsius or Fahrenheit).
	MODBUS ID	Set up the MODBUS ID for the MODBUS port located at the rear of the touch panel.
	Baud Rate	Set up the baud rate for the MODBUS port located at the rear of the touch panel.

## 7.6.6 IP Setting

Path:  → IP Setting

Item	Description
DHCP Client	Enable or disable the DHCP client.
IP Address	Set up the IP address.
Subnet Mask	Set up the subnet mask.
Gateway IP	Set up the gateway IP address.
DNS 1 IP	Set up the DNS server 1 IP address.
DNS 2 IP	Set up the DNS server 2 IP address.
Search Domain	Set up the search domain.
Host Name	Set up the host name.
MAC Address	It shows the MAC address.

## 7.6.7 Network Service

Path:  → Network Service

Item	Sub Item	Description
Web	HTTP	Enable or disable HTTP service (default: Disable).
	HTTPS	Enable or disable HTTPS service (default: Enable).
	MODBUS TCP	Enable or disable MODBUS TCP service (default: Disable).
	MODBUS TCP ID	Set up the MODBUS ID for the MODBUS TCP (default: 1).
SNTP	Time Zone	Select the time zone.
	Primary Time Server	Set up the primary time server for SNTP.
	Secondary Time Server	Set up the secondary time server for SNTP.
	Period time	Set up the period time to decide the STS and time server's time synchronization frequency.

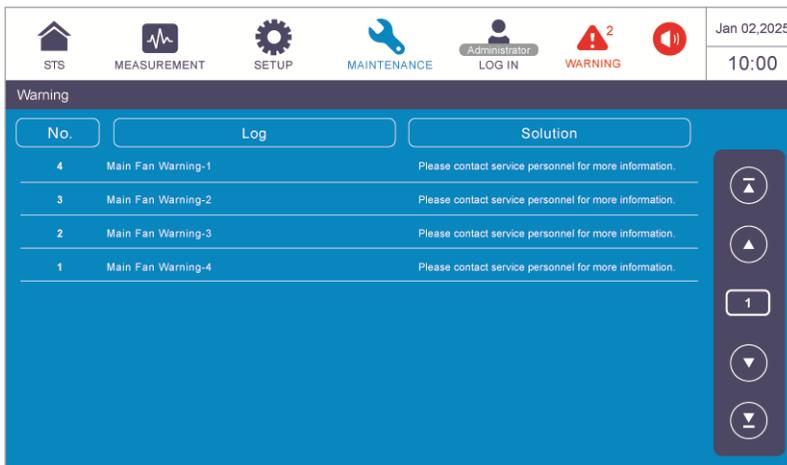
Item	Sub Item	Description
SNTF (continued)	Daylight Saving	Enable or disable daylight saving time.

## 7.7 System Maintenance

### 7.7.1 Warning

Path 1:  MAINTENANCE → Warning

Path 2: When there is a warning, the buzzer icon () will light up in red, and the buzzer will sound. Tap the warning icon () to enter the **WARNING** screen.



### 7.7.2 Event Log

Path:  MAINTENANCE → Event Log



The screen shows the control card 1 and control card 2's event logs. Refer to the table below for button information.

Item	Description
Filter Button	Select the event log type, which includes <b>All</b> , <b>Warning</b> and <b>Alarm</b> .
Backup Button	Back up the event logs (the administrator password is required).
Download Backup File Button	Download the latest backup data.  <b>NOTE:</b> The <b>Download Backup File</b> button will show up only after you are logged in as <b>Administrator</b> and connect a user-supplied USB flash drive to the USB port (see <i>Figure 4-9</i> ).
Download Button	Download the event logs.  <b>NOTE:</b> The <b>Download</b> button will show up only after you are logged in as <b>Administrator</b> and connect a user-supplied USB flash drive to the USB port (see <i>Figure 4-9</i> ).

### 7.7.3 Clear

Path:  MAINTENANCE → Clear

Item	Description
Clear Statistics	Clear all statistics.
Clear Kilowatt Hour	Clear all kilowatt hour records.
Clear Transfer Number	Clear all transfer number records.



#### NOTE:

The records mentioned above are important information for system analysis and maintenance. After you select '**Clear**' and confirm clearance of the item, all the recorded data will be cleared. Do not clear any of them without the consent of qualified service personnel.

## 7.7.4 S/N

Path:  MAINTENANCE → S/N

Item	Sub Item	Description
S/N	Control Card 1	Check the control card 1's serial No.
	Control Card 2	Check the control card 2's serial No.
	System	Check the system's serial No.

## 7.7.5 Version

Path:  MAINTENANCE → Version

Item	Sub Item	Description
MAIN	Control Card 1_ MCU	Check and update the control card 1's MCU firmware version.
	Control Card 2_ MCU	Check and update the control card 2's MCU firmware version.
	Touch Panel _ MCU	Check and update the touch panel's MCU firmware version.

## Chapter 8 : Optional Accessories

No.	Item	Function
1	Dust Filter	It prevents dust from entering into the STS to ensure STS reliability and to prolong product life.

**NOTE:**

For installation and operation details, please refer to the *Quick Guide/ User Manual* included in the package of the optional accessory. To purchase the accessory mentioned above, please contact your local dealer or customer service.

## Chapter 9 : Maintenance

- **STS**

1. STS Cleaning:

The STS requires proper airflow to maintain its normal operating temperature. All vents and filters should be checked and cleaned regularly to prevent the unit from overheating.

2. STS Regular Inspection:

- A. Customers should perform monthly check on filters and clean and replace them as needed.
- B. Delta recommends arranging the STS in a regular semiannual maintenance schedule to inspect:
  - 1) Function of all indicators and LEDs.
  - 2) Thermal scan of critical connections (once a year).

- **Fans**

The normal fan life is 5 ~ 7 years. As higher operating temperature will shorten fan life, preemptive replacement of fans is recommended at five-year intervals.



**NOTE:**

Please ask your local dealer or customer service for more maintenance information. Do not perform maintenance if you are not trained for it.

## Appendix 1 : Technical Specifications

Model		STS 800A-C
Current Rating		800A
Input	Nominal Voltage	220/380, 230/400, 240/415 (default) Vac (3 $\Phi$ 4W + PE)
	Voltage Range	$\pm 10\%$
	Frequency Range	58 ~ 62 Hz/48 ~ 52 Hz (default)
	Voltage Distortion	Up to 10% THD (with notches and ringing transients)
	Current	800A
Output	Voltage	220/380, 230/400, 240/415 (default) Vac (3 $\Phi$ 4W + PE)
	Frequency	60 Hz $\pm$ 2 Hz /50 Hz $\pm$ 2 Hz (default)
	Overload Capability	101% ~ 125%: 30 minutes 126% ~ 150%: 2 minutes 151% ~ 500%: 0.25 seconds
	Short Circuit Current Withstand	65 KAIC
	Transfer Time	Compliance with ITIC curve
	Load Power Factor Range	0.75 to 1.0 (leading or lagging)
	Load Crest Factor	Up to 3.5
Display		10" touch panel

Model		STS 800A-C
Interface	Standard	EPO dry contact × 1 (reserved), Breaker status input dry contact × 6 (reserved), Output dry contact × 6, Input dry contact × 4, Maintenance port × 4, EMS/ CONSOLE × 1 (reserved), USB port × 1, Network port × 1
Efficiency	Normal Mode	> 99%
Environment	Storage Temperature	-40 ~ 80°C (-40 ~ 176°F)
	Operating Temperature	0 ~ 40°C (32 ~ 104°F)
	Relative Humidity	95% (non-condensing)
	Operating Altitude	Up to 1,220 m (4,002.62 ft)*1 above sea level without derating
	Storage/ Transport Altitude	Up to 12,200 m (40,026.25 ft) above sea level without derating
	Audible Noise	< 70 dBA *2
Physical	Dimensions (W × D × H)	1657 × 905 × 2199 mm (65.24" × 35.63" × 86.57")
	Weight	1360 kg (2998.29 lb)



**NOTE:**

1. \*1 When the altitude is above 1,220 m (4,002.62 ft), the output current will be derated by 6% for every increase of 300 m (984.25 ft).
2. \*2 At a distance of 1.5 m (4.92 ft) in front of the STS.
3. Please refer to the rating label for the safety certification.
4. All specifications are subject to change without prior notice.

## Appendix 2 : Warranty

Seller warrants this product, if used in accordance with all applicable instructions, to be free from original defects in material and workmanship within the warranty period. If the product has any failure problem within the warranty period, Seller will repair or replace the product at its sole discretion according to the failure situation.

This warranty does not apply to normal wear or to damage resulting from improper installation, operation, usage, maintenance or irresistible force (i.e. war, fire, natural disaster, etc.), and this warranty also expressly excludes all incidental and consequential damages.

Maintenance service for a fee is provided for any damage out of the warranty period. If any maintenance is required, please directly contact the supplier or Seller.



### **WARNING:**

The individual user should take care to determine prior to use whether the environment and the load characteristic are suitable, adequate or safe for the installation and the usage of this product. The User Manual must be carefully followed. Seller makes no representation or warranty as to the suitability or fitness of this product for any specific application.

No. : 501332760000

Version : V 0.0

Release Date : 2025\_12\_24



5013327600