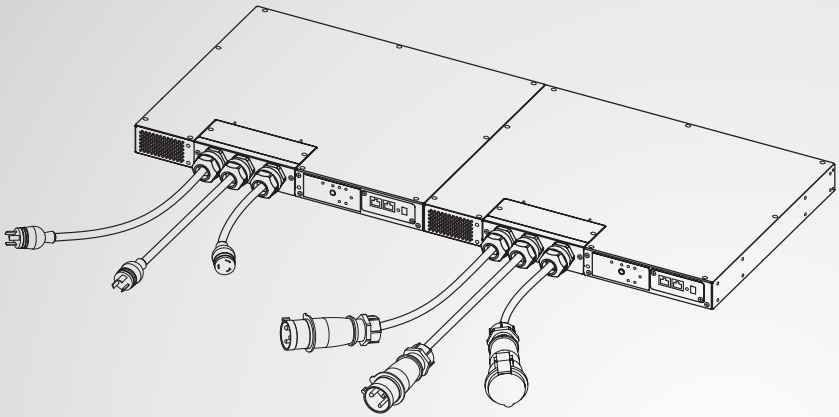


The power behind competitiveness

Delta Infrasuite Power Management

Static Transfer Switch Series

User Manual

www.deltapowersolutions.com

Smarter. Greener. Together.

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.

Table of Contents

Chapter 1 : Important Safety Instructions

1.1 Important Safety Notes

- Only qualified personnel can service this equipment.
- Follow the following precautions when working on this unit.
  1. Remove watches, rings, or other metal objects.
  2. Use tools with insulated handles.
  3. Examine the packing container. Notify the carrier immediately if any damage is present.
  4. Do not disassemble the unit.
  5. Do not operate the unit near water or in an area with excessive humidity.
  6. Keep liquid and foreign objects from getting inside the unit.
  7. Do not operate the unit close to gas or fire.
- Upstream circuit breaker must be added for each input. The recommended breaker is D curve 30A for STS30002SR00035 and D curve 32A for STS30002SR10035.
- Verify whether the branch circuit breaker or fuse on service feed is correct.
- Verify line voltage requirements and the supplied line voltage prior to installation.

1.2 Electrical Warnings

- When servicing this equipment, you may need to remove its protective covers and connect utility power. Please observe great caution during these procedures.
- Check that power cords, plugs, and outlets are in good condition.

1.3 Standard Compliance

- **Safety**

  UL (US) : UL 60950-1

  CE (EU) : IEC/EN 60950-1

- **EMI**

  CISPR 22 Class A and FCC Class A

- **EMS**

  IEC 61000-4-2 IEC 61000-4-6

  IEC 61000-4-3 IEC 61000-4-8

  IEC 61000-4-4 IEC 61000-4-11

  IEC 61000-4-5

- **IPv6 Certification**

  IPv6 Ready Logo Phase 2 (Core for Host, Logo ID 02-C-000624)

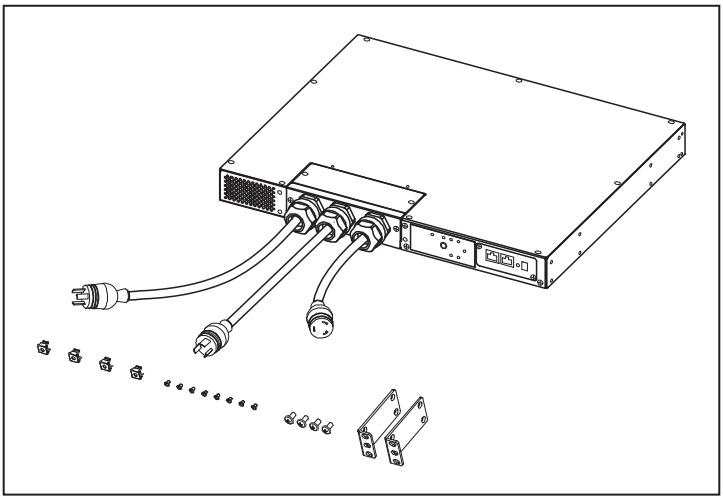
Chapter 2 : Package and Storage

2.1 Package Contents

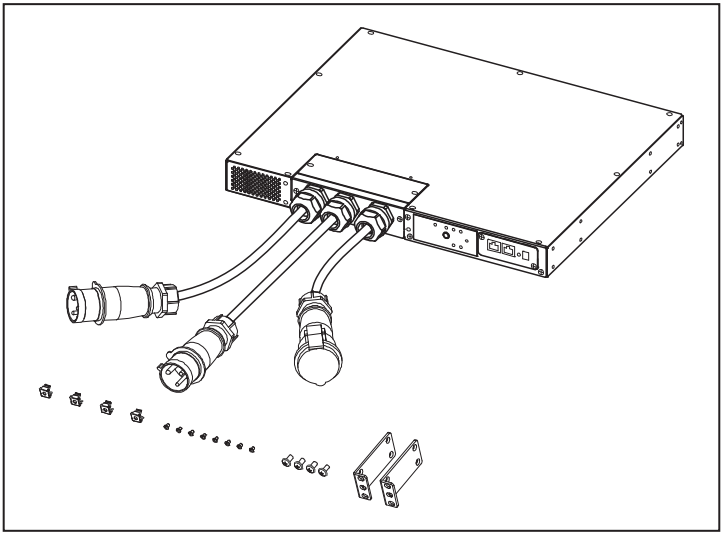
STS package contains the following items.

1. STS module X1
2. Rack mounting bracket X2
3. Bracket screw X8
4. Rack screw X4
5. Rack nut X4

Model: STS30002SR00035



Model: STS30002SR10035



2.2 Storage

Please store the STS in its original package and in a dry place. Keep the storage temperature between -15℃ ~ +50℃ .

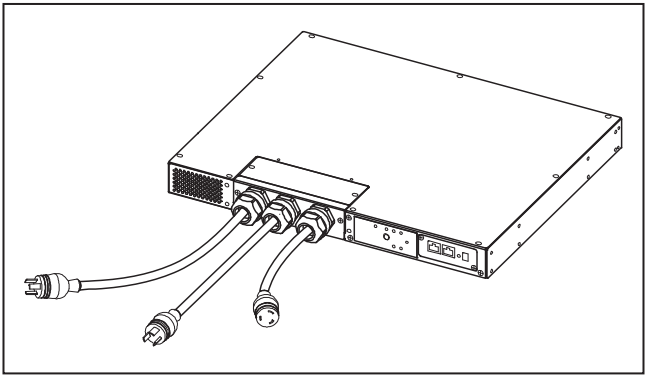
Chapter 3 : Product Introduction

3.1 Models

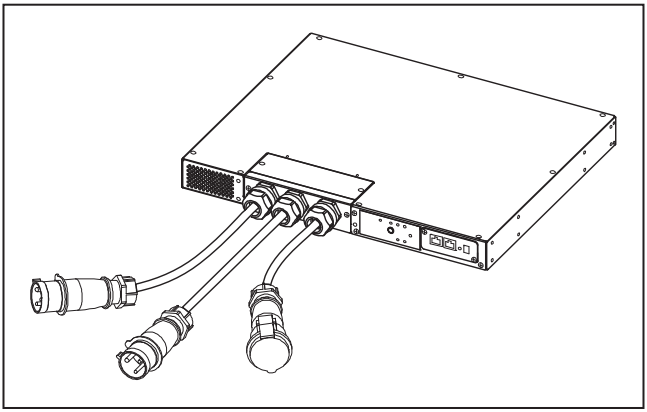
There are three models. Please see the following table and pictures.

		STS30002SR00035	STS30002SR10035
		US Model	EU Model
Input	Type	L6-30P	IEC309-32A
	Length	3600MM (12 feet)	4000MM
Output	Type	L6-30R	IEC309-32A
	Length	450MM (18 inches)	1000MM

Model: STS30002SR00035



Model: STS30002SR10035



3.2 Product Description

The STS is designed to guarantee the uninterrupted operation of sensitive equipment. It is powered by two independent power sources and automatically makes a rapid switch from one source to the other when the power supply used to power its connected load fails. This STS is designed to be efficient and reliable.

Users can know power flow and the STS's status from the user-friendly front panel. Besides, the unit has a network interface for users to read and write parameters. The network interface can be implemented via the Ethernet protocol through an RJ45 connector. All information is available on the front panel and the LOCAL port on the front panel is available over the network through the RJ45 connector.

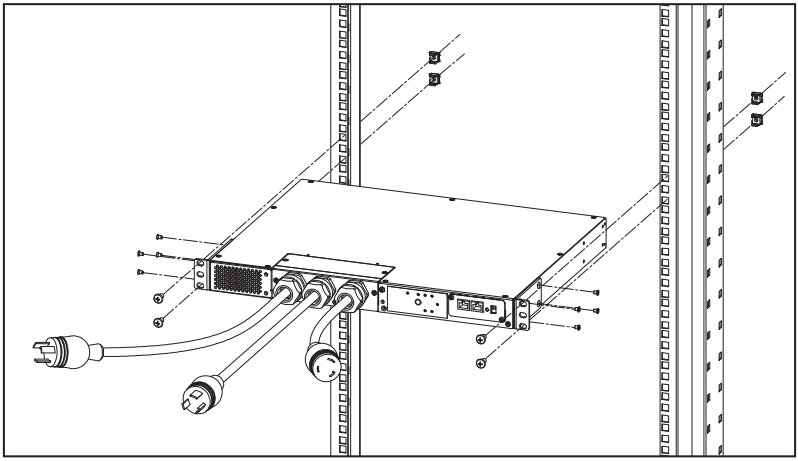
3.3 Features

- Flexible installation
  --- Front installation and rear installation for rack mounting
  --- Three types of wirings (L6-30P, IEC309, and Phoenix Connector)
- Self-test function
  --- Power-on self-test
  --- Manual self-test
- Withstands high inrush current
  -- SCR design withstands high inrush current during transferring process.

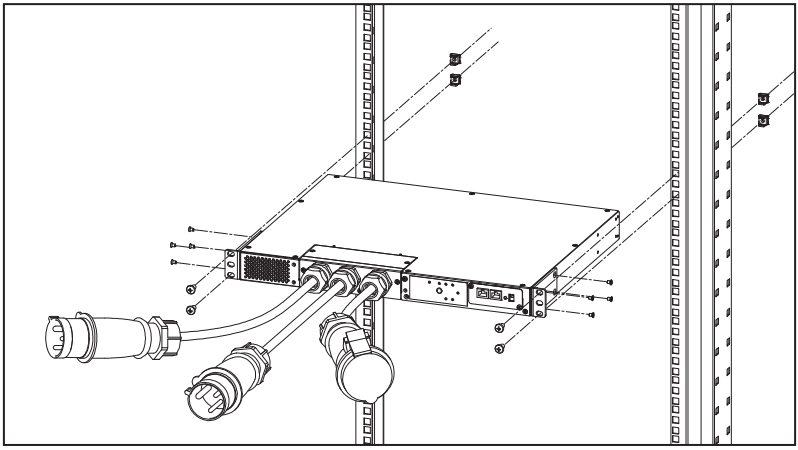
Chapter 4 : Installation

4.1 Front Installation for Rack Mounting

Model: STS30002SR00035

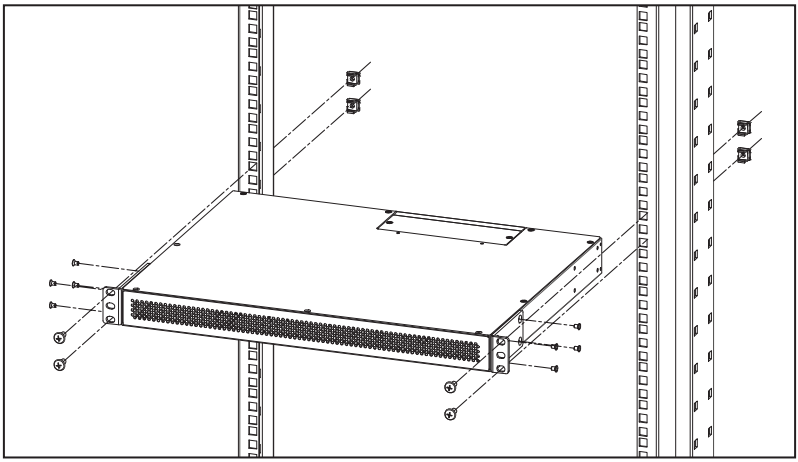


Model: STS30002SR10035



4.2 Rear Installation for Rack Mounting

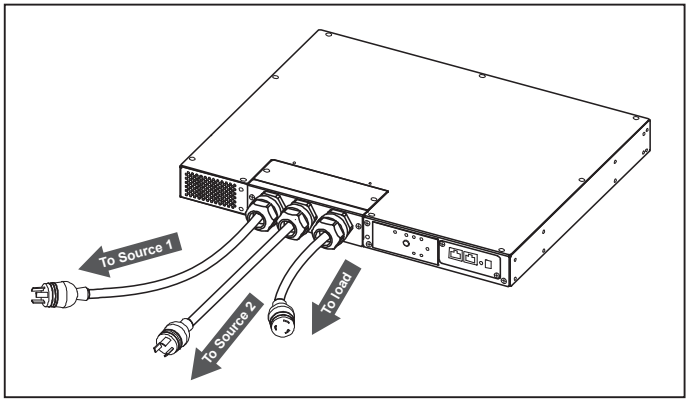
Model: STS30002SR00035/ STS30002SR10035



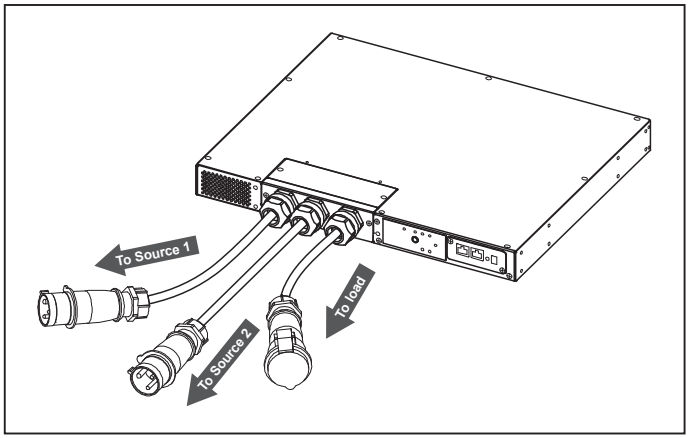
Chapter 5 : Wiring

- Connect input power cables to two power sources (source 1 (S1) & source 2 (S2)). Source 1 (S1) is the preferred source.
- Connect output power cable to load.
- Connect Ethernet cable to the front panel's 'NETWORK' port.

Model: STS30002SR00035

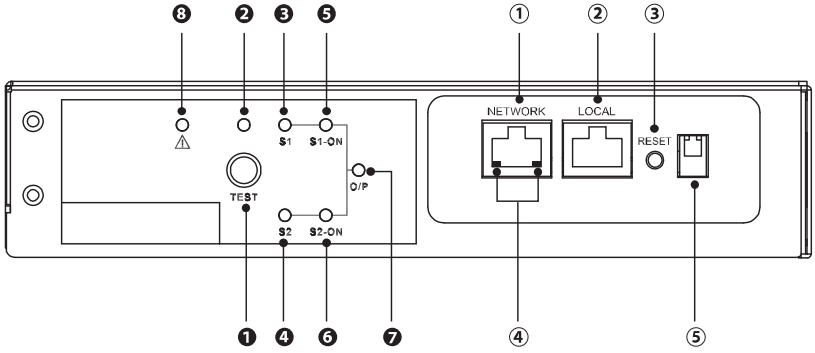


Model: STS30002SR10035



Chapter 6 : Operation

6.1 Front Panel



❶ **Test button:**

Use this button to test the STS. Press this button, the STS will transfer to the 2nd source for 1 minute and then transfer back to original preferred source.

❷ **Test LED:**

Green. If you press the test button, the STS will be under test conditions and the Test LED will flash (on: 0.5s; off: 0.5s). In normal operation, this LED will be off.

❸ **S1 LED:**

Green. This LED indicates the condition of input source 1. If the input source 1 is within acceptable range, this LED will light up as green. If the input source 1 is out of acceptable range, this LED will be off.

❹ **S2 LED:**

Green. This LED indicates the condition of input source 2. If the input source 2 is within acceptable range, this LED will light up as green. If the input source 2 is out of acceptable range, this LED will be off.

❺ **S1_ON LED:**

Green. If the STS uses input source 1 to supply power to the output, this LED will light up as green. If not, this LED will be off.

❻ S2_ON LED:

Green. If the STS uses input source 2 to supply power to the output, this LED will light up as green. If not, this LED will be off.

❼ O/P LED:

Green. This LED indicates the output condition (voltage is > 60Vac). If there is output, this LED will light up as green. If not, this LED will be off.

❽ Fault LED:

Red. If the STS has any internal fault, this LED will light up as red. If the STS has any environmental fault, this LED will flash (on: 0.5s; off: 0.5s). Via the **'NETWORK'** port, fault messages will be sent to a connected PC. From the PC, you can see error codes as follows.

Environmental fault	
E01	Output overload
E02	Over temperature (due to detection of ambient temperature)
E03	Over temperature warning (due to detection of S1 heat-sink temperature)
E04	Over temperature warning (due to detection of S2 heat-sink temperature)
Internal Fault	
E11	Over temperature (due to detection of S1 heat-sink temperature)
E12	Over temperature (due to detection of S2 heat-sink temperature)
E13	Auxiliary power 1 circuit is failed
E14	Auxiliary power 2 circuit is failed
E21	Input relay of S1 is open
E22	Input relay of S1 is short
E23	Input relay of S2 is open
E24	Input relay of S2 is short
E25	Input SCR of S1 is open
E27	Input SCR of S2 is open

① **NETWORK port:**

Connects to the Ethernet Network.

② **LOCAL port:**

Connects to a workstation with an RJ45 to DB9 cable to configure the system.

③ **RESET button:**

Resets InsightPower SNMP IPv6 for STS (hereafter referred to as SNMP IPv6). This **DOES NOT** affect the operation of the STS.

④ **LED indicators**

NET LED (green) indicates network communication status.

STS LED (yellow) indicates the STS's communication status.

LED	Condition	Meaning	
ALL	Blinking Rapidly	Firmware is upgrading.	
NET LED	OFF	Ethernet is unlinked.	
NET LED	Blinking	Ethernet is linked but no DHCP server is found. (Default IP 192.168.1.100)	
NET LED	Green	Ethernet is linked.	
STS LED	OFF	1. Initialization 2. SNMP IPv6 abnormality	
STS LED	Amber	SNMP IPv6 abnormality	
STS LED	Blinking	Every second	Poor connection between the STS and the SNMP IPv6.
		Every 50 ms	Normal connection between the STS and the SNMP IPv6.

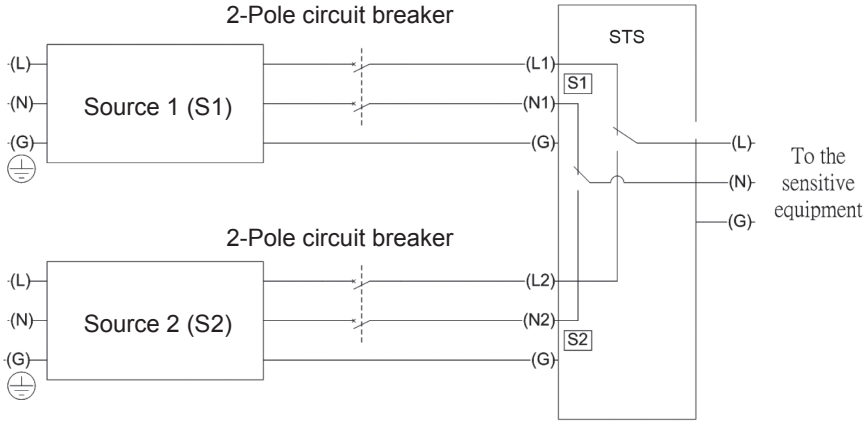
⑤ **DIP switches:**

Set up operation mode

Dip 1	Dip 2	Operation Mode	Description
OFF	OFF	Normal Mode	The built-in SNMP IPv6 provides the STS's status information and parameters through a network system.

Dip 1	Dip 2	Operation Mode	Description
OFF	ON	Pass Through Mode	The built-in SNMP IPv6 stops polling the STS but transfers the communication data between the 'LOCAL' port and the STS. ModBus Communication: 9600bps 8-N-1
ON	OFF	-	Invalid state
ON	ON	Configuration Mode	In this mode, users can login through the 'LOCAL' port and configure the built-in SNMP IPv6's settings.

6.2 Operation



After power connection, the STS will automatically perform power-on self-test. After the test, the STS will start supplying power to its connected equipment. You can also press the **'Test Button'** to force the STS to execute self-test.

Chapter 7 : InsightPower SNMP IPv6 for STS

7.1 Introdction of InsightPower SNMP IPv6 for STS

The InsightPower SNMP IPv6 for STS, hereafter referred to as SNMP IPv6, is built in the STS and is a device that provides an interface between the STS and a network. It communicates with the STS, acquires its information and remotely manages the STS via a network system. The SNMP IPv6 supports public protocols including SNMP and HTTP. You can effortlessly configure this SNMP IPv6 using a network system and easily obtain your STS's status and manage your STS via the SNMP IPv6.

7.2 SNMP IPv6 Features

- **Network STS management**

  Allows remote management of the STS from any workstation through Internet or Intranet.

- **Remote STS monitoring via SNMP & HTTP**

  Allows remote monitoring of the STS using SNMP NMS, Delta MIB (Management Information Base) or a Web Browser.

- **STS and system function configuration from any client (password protected)**

  Sets the STS and system parameters through a Web Browser.

- **Event logs & metering data keeping**

  Provides a history data of the STS's power events, power quality and status.

- **Other features and supported protocols include:**

  - User notification via SNMP Traps and e-mail
  - Network Time Protocol
  - Telnet configuration
  - BOOTP/ DHCP
  - HTTPS, SSH, SFTP and SNMPv3 security protocols

- RADIUS (Remote Authentication Dial In User Service) login and local authentication
- Remote event log management through syslog
- IPv6 Ready Logo certified (ID 02-C-000624)

DEFAULT SETTING

User Name: *admin*

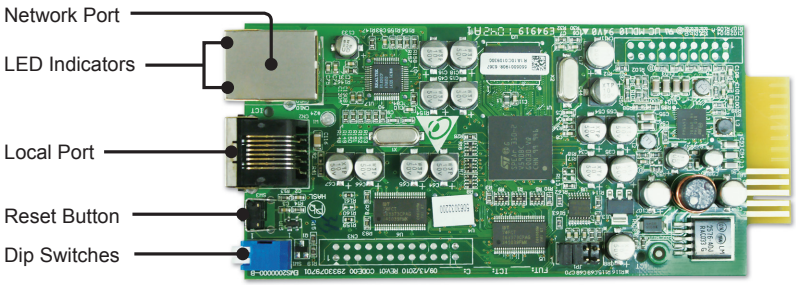
Password: *password*

DHCP Client: Enable

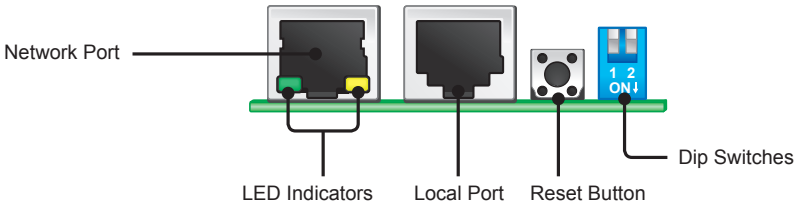
IPv4 Address: *192.168.1.100*

7.3 Top Veiw and Front Veiw of SNMP IPv6

- **Top View**



- **Front View**



7.4 Console Managemnt

You can manage the SNMP IPv6 through the 'LOCAL' port. Please use an RJ45 to DB9 cable to connect the SNMP IPv6's 'LOCAL' port and your workstation's COM port. Make sure both of the DIP switches are set to the **OFF** position (normal mode). The baud-rate of the workstation's COM setting should be **2400** bps.

- **Web Card Main Menu**

```
+========================+
|   Web Card Main Menu   |
+========================+
Web Card Version 01.12.11f
MAC Address 00-30-ab-26-b1-b4
[1].User Manager
[2].TCP/IP Setting
[3].Network Parameter
[4].Time Server
[5].Soft Restart
[6].Reset All To Default
[d].Device Communication
[z].Exit Without Save
[0].Save And Exit

Please Enter Your Choice =>
```

- **User Manager**

```
+========================+
|     User Manager       |
+========================+
RADIUS
[1].RADIUS Auth: Disable
[2].Server:
[3].Secret:
[4].Port:       1812
----------------
Local Auth
    Administrator
[5].Account:    admin
[6].Password:   ********
[7].Limitation: Only in This LAN
    Device Manager
[8].Account:    device
[9].Password:   ********
[a].Limitation: Only in This LAN
    Read Only User
[b].Account:    user
[c].Password:   ********
[d].Limitation: Allow Any
[0].Back To Previous Menu

Please Enter Your Choice =>
```

- **TCP/ IP Setting**

```
+========================+
|     TCP/IP Setting     |
+========================+
[1].IPv4 Address:        192.168.1.100
[2].IPv4 Subnet Mask:    255.255.255.0
[3].IPv4 Gateway IP:     192.168.1.254
[4].IPv4 DNS or WINS IP:192.168.1.254
[5].DHCPv4 Client:       Enable
[6].IPv6 Address:        ::
[7].IPv6 Prefix Length: 0
[8].IPv6 Gateway IP:     fe80::226:Sbff:fecc:fdal
[9].IPv6 DNS IP:         ::
[a].DHCPv6:              Disable
[b].Host Name(NetBIOS): INSIGHTPOWER
[c].System Contact:
[d].System Location:
[e].Auto-Negotiation:    Enable
[f].Speed:               100M
[g].Duplex:              Full
[h].Status Stable:       3
[i].Telnet Idle Time:    60 Seconds
[0].Back To Previous Menu

Please Enter Your Choice =>
```

- **Network Parameter**

```
+========================+
|    Network Parameter   |
+========================+
[1].HTTP Server:           Enable
[2].HTTPS Server:          Enable
[3].Telnet Server:         Disable
[4].SSH/SFTP Server:       Enable
[5].FTP Server:            Enable
[6].Syslog:                Disable
[7].HTTP Server Port:      80
[8].HTTPS Server Port:     443
[9].Telnet Server Port:    23
[a].SSH Server Port:       22
[b].FTP Server Port:       21
[c].Syslog Server1:
[d].Syslog Server2:
[e].Syslog Server3:
[f].Syslog Server4:
[g].SNMP Get,Set Port:  161
[0].Back To Previous Menu

Please Enter Your Choice =>
```

- **Time Server**

```
+========================+
|       Time Server      |
+========================+
[1].Time Selection:      SNTP
[2].Time Zone:           +0 hr
[3].1st Time Server:
[4].2nd Time Server:
[5].Manual Date:         01/01/2000 (MM/DD/YYYY)
[6].Manual Time:         00:00:00 (hh:mm:ss)
[0].Back To Previous Menu

Please Enter Your Choice =>
```

- **Soft Restart**

```
+========================+
|   Web Card Main Menu   |
+========================+
Web Card Version 01.12.11f
MAC Address 00-30-ab-26-b1-b4
[1].User Manager
[2].TCP/IP Setting
[3].Network Parameter
[4].Time Server
[5].Soft Restart
[6].Reset All To Default
[d].Device Communication
[z].Exit Without Save
[0].Save And Exit

Please Enter Your Choice => 5

The Web Card Will Restart.
Are You Sure? [Y]es/[N]o =>
```

- **Device Communication**

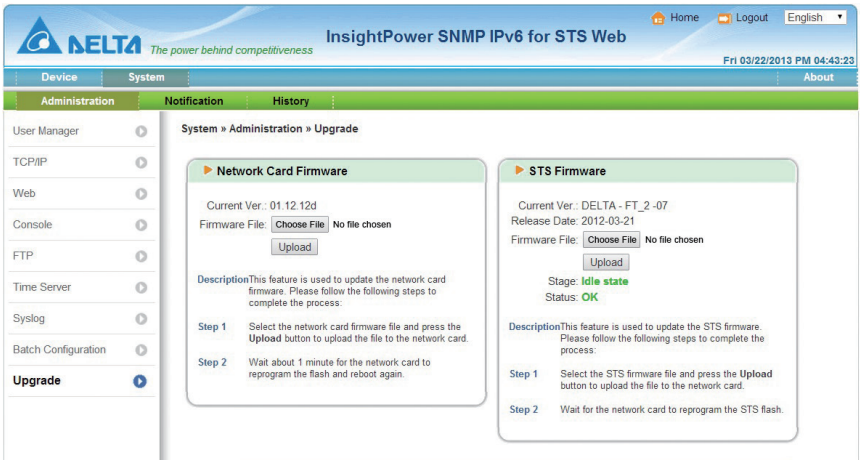
  You can enter the **STS Command Mode** below by selecting Device Communication.

```
STS> Vs1
216.8
STS> Vs2
217.9
STS> Iout
8.1
STS> Vout
217.1
STS> Vbp2s
180.0
STS> Vbs2p
180.0
STS> Tdp2s
12.0
STS> Tds2p
12.0
STS> TempF
96
STS> TempC
36
STS> Age
1075878
STS> Time
13:3:24 07/18 2011
STS> XCount
4402
STS> Prefer
S1
STS> DevID
12345678901234567890
STS> Serial

STS> Tprev1
13:35:16 07/18/2011
STS> Event1
0x0029
STS> Log
10
STS> Log 1
13:35:16 07/18/2011 0x0029
STS>

STS> SetDevID 1234567890abcdefghijklmn

STS> DevID
12345678901234567890
STS> SetDevID 1234567890abcdefghij

STS> DevID
1234567890abcdefghij
STS>
```

7.5 Upgrade

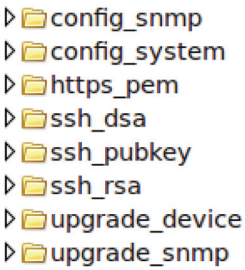
- **Upgrade via Web**

  You can upgrade the SNMP IPv6's firmware or the STS's firmware through **the InsightPower SNMP IPv6 for STS Web** (please see the following figure). The SNMP IPv6 will restart after finishing self-upgrade. If you upload the STS's firmware to the Web, you can see the STS's firmware upgrade progress from the Web.



- **Upgrade via FTP/ SFTP**

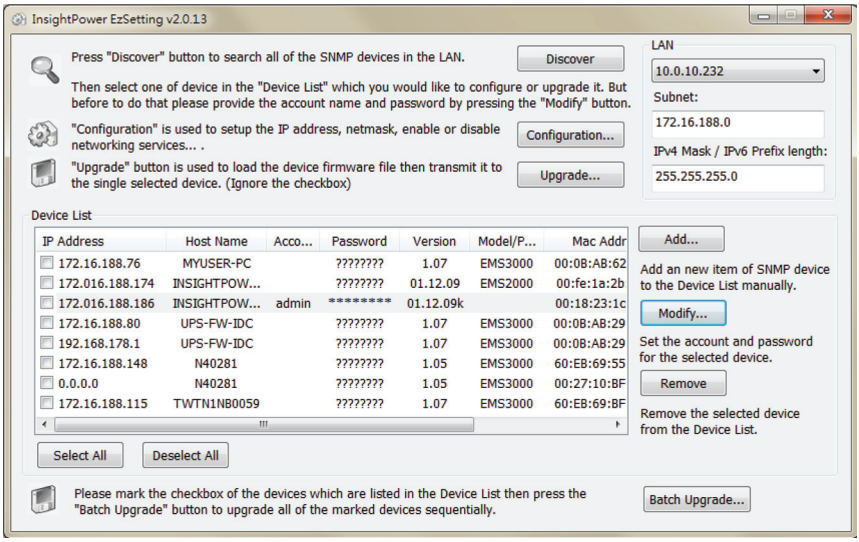
  You can also upgrade the SNMP IPv6's firmware or the STS's firmware by using FTP or SFTP program. Make sure you upload correct images to **upgrade_snmp** when upgrading SNMP IPv6's firmware, and upload correct images to **upgrade_device** when upgrading the STS's firmware.



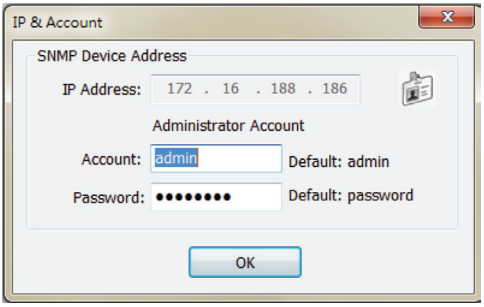
- **Upgrade via EzSetting**

  You can also upgrade the SNMP IPv6's firmware or the STS's firmware by using EzSetting.

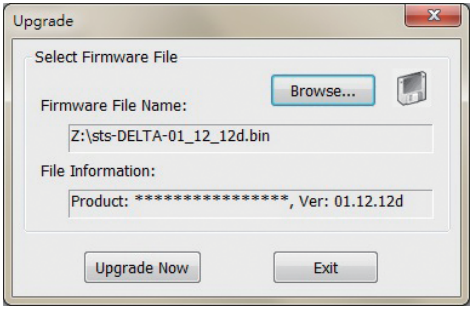
  1. Click **Discover.** A list of SNMP devices is shown. Select a device from the Device List, and click **Modify**.



  2. Enter Administrator account and password.



3. Click **Upgrade**. The upgrade dialog box pops up. Click **Browse** to select a valid firmware binary file. Verify the firmware version shown under File Information, and then click **Upgrade Now** to continue.



7.6 STS Command Settings

Command	Description	Parameter	Response
Info	Report summary information.		<Command>: [<response>] [<unit>]
TempF	Report internal STS fahrenheit temperature.		#
TempC	Report internal STS celsius temperature.		#
Age	Report internal STS age.		#
Time	Report present time.		hh:mm:ss MM/DD/YYYY
XCount	Report number of times that STS has transferred.		#
Model	Report the model name.		<model name string>
FWVer	Report the FW version.		<version string>
FWDate	Report the FW release date.		YYYY-MM-DD
Serial	Report the unit's serial number.		<Device serial string>
DevID	Report the unit's device ID.		<Device ID string>
Prefer	Report the preferred source.		S1 or S2
Sens	Report the sensitivity.		hi or low

Command	Description	Parameter	Response
Mode	Report the operation mode.		Initialization Diagnosis Off S1 S2 Safe Fault
Vout	Report the output voltage.		#.#
Iout	Report the output current.		#.#
Vs1	Report the primary voltage.		#.#
Vs2	Report the secondary voltage.		#.#
Fs1	Report the primary frequency.		#.#
Fs2	Report the secondary frequency.		#.#
Vtp2s	Report the primary to secondary trip voltage.		#.#
Vts2p	Report the secondary to primary trip voltage.		#.#
Vbp2s	Report the primary to secondary brownout voltage.		#.#
Vbs2p	Report the secondary to primary brownout voltage.		#.#
Tdp2s	Report the recover time of transfer from primary to secondary.		#.#
Tds2p	Report the recover time of transfer from secondary to primary.		#.#
Mvs1	Report the max voltage of comparing cycles for primary AC blackout.		#.#
Mvs2	Report the max voltage of comparing cycles for secondary AC blackout.		#.#
Mts1	Report the max time of comparing cycles for primary AC blackout.		#.#

Command	Description	Parameter	Response
Mts2	Report the max time of comparing cycles for secondary AC blackout.		#.#
Log	Report the event code and time of prior transfers.	1 ~ 10	hh:mm:ss MM/DD/YYYY 0x#
Tprev[1..9]	Report the time of prior transfer/event. Tprev1 is the most recent time.		hh:mm:ss MM/DD/YYYY
Event[1..9]	Report the event code for prior transfer. Event1 is the most recent event.		0x#
ClearLog	Clear event log.		
SetTime	Set the present time.	hh:mm:ss [MM/DD/YYYY]	
SetDate	Set the present date.	MM/DD/YYYY	
SetPrefer	Set the preferred source.	1 or 2	
SetDevID	Set the unit's device ID.	<20 characters> alphanumeric only	
SetVtp2s	Set the primary to secondary trip voltage.	165.0 ~ 175.0	
SetVts2p	Set the secondary to primary trip voltage.	165.0 ~ 175.0	
SetVbp2s	Set the primary to secondary brownout voltage.	180.0 ~ 264.0	
SetVbs2p	Set the secondary to primary brownout voltage.	180.0 ~ 264.0	
SetTdp2s	Set the recover time of transfer from primary to secondary.	12.0 ~ 1800.0	
SetTds2p	Set the recover time of transfer from secondary to primary.	12.0 ~ 1800.0	
SetMvs1	Set the max voltage of comparing cycles for primary AC blackout.	30 ~ 50	
SetMvs2	Set the max voltage of comparing cycles for secondary AC blackout.	30 ~ 50	

Command	Description	Parameter	Response
SetMts1	Set the max time of comparing cycles for primary AC blackout.	2.0 ~ 4.0	
SetMts2	Set the max time of comparing cycles for secondary AC blackout.	2.0 ~ 4.0	
UpProcess	Status of upgrade progress.		Idle / Run / Error
UpStep	Stage of upgrade progress.		Init / File ID / Auth / Addr / Erase / Program / Read
UpPercentage	Percentage of upgrade progress.		#.#
UpResult	Result of upgrade progress.		OK / No response / File ID fail / Authentication fail / Erase fail / Flash fail / Read fail / Upgrade completion
UpDate	Report each FW upgrade time.	[Index] [# to show] # = 1 - 20	hh:mm:ss MM/DD/YYYY
AgentVer	Report SNMP card version.		AA.BB.XXX
Link	Check current Modbus connection.		1 - Normal / 2 - Abnormal / 3- Upgrading
Bye	Terminate remote connection.		

7.7 Key Generation for SSH

- **For Linux**

  (1) Please download and install OpenSSH from http://www.openssh.org.

  (2) Launch shell and enter the following command to create your own keys.

  Please ignore it when prompted to provide passphrase.

  DSA Key:ssh-keygen –t dsa

  RSA Key:ssh-keygen –t rsa

  (3) Upload DSA and RSA key files on the web.

- **For Windows**

  (1) Please download and install PuTTY from http://www.putty.org.

  (2) Run **puttygen.exe** from the installed directory.

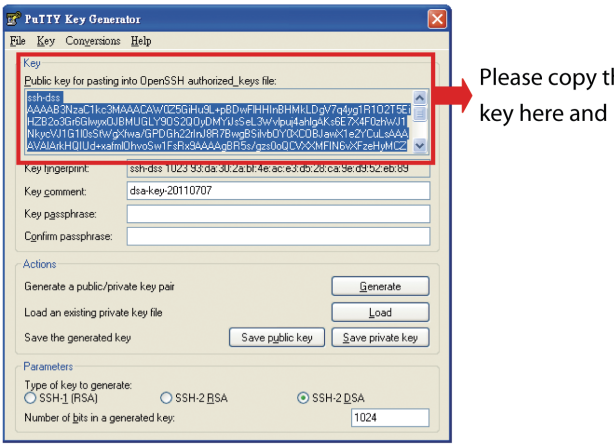
  (3) Select **SSH-2 RSA** from the Parameters area and click **Key→ Generate key pair** to generate an RSA key.

  (4) Select **Conversions→ Export OpenSSH Key** and assign a file name to the RSA key. Please ignore it when prompted to provide key passphrase.

  (5) Select **SSH-2 DSA** from the Parameters area and select **Key→ Generate key pair** to generate a DSA key.

  (6) Select **Export OpenSSH Key** from **Conversions** and assign a file name to the DSA key. Please ignore it when prompted to provide key passphrase.

  (7) Upload the DSA and RSA key files to the web.



Please copy the context of public key here and paste it into a key file.

Chapter 8 : Troubleshooting

Problem	Possible case	Solution
All LEDs on the front panel are off.	The power sources, S1 and S2, are both absent.	1. Check the output (overload/ short-circuit). 2. Check both power sources, S1 and S2. 3. Reset the upstream circuit breakers.
S1 or S2 LED is off.	The corresponding power source is absent or out of range.	1. Check the corresponding power source. 2. Reset the corresponding upstream circuit breaker.
Fault LED flashes.	Output overload.	Reduce the connected load.
	Over temperature.	Check the environment temperature.
Fault LED lights up.	Internal component damage.	Please contact service personnel.
Can not communicate with the STS.	Wrong setting or malfunction.	Refer to the user manual of InsightPower SNMP IPv6 for STS.

Appendix 1 : Specifications

	Specifications	
Operating Voltage	180V to 264V	
Operating Frequency	45Hz to 65HZ	
Current Rating	25.6A for CE/ 24A for UL	
Physical Dimensions	43mm x 440mm x 355mm (H x W x D)	
Weight	STS30002SR00035: 7.7Kg	
	STS30002SR10035: 7.6Kg	
Environment	Operating temperature	0~40℃
	Storage temperature	-15~50℃
	Humidity	5%~95% RH (non-condensing)
	Acoustic noise	<45dBA measured at a distance of 1 meter in front of the STS under full-load condition.
	Operating Elevation	0 to 2000m (0 to 6252ft)

NOTE :

1. Refer to the rating label for the safety rating.
2. 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.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