9130 Service Documents

1.	User's Guide	164201718
	Data Sheet	1018083
	Technical-specification	1028846
2.	Service Manual & Alarm list	1028792
	Service Tool Watcher Instruction	1028793
3.	Spare part list	1028794
4.	Circuit diagrams	

Power board 700 VA Tower	SK710-02663-01
Power board 1000 VA Tower & RM	SK710-02662-01
Power board 1500 VA Tower & RM	SK710-02661-01
Power board 2000 VA Tower	SK710-02345-00
Power board 2000 VA RM	SK710-02340-03
Power board 3000 VA Tower	SK710-02346-00
Power board 3000 VA RM	SK710-02341-03
Charger 24V 700 VA Tower	SK710-61269-01
Charger 36V 1000 VA Tower & RM	SK710-61266-02
Charger 48V 1500 VA Tower & RM	SK710-61255-00
Charger 96V 2000-3000 VA Tower	SK710-61253-01
Charger 72V 2000-3000 VA RM	SK710-61234-02
Control board 700–3000 VA Tower & RM	SK710-83405-02
Communication board 700–3000 VA Tower & RM	SK710-00942-03
LCD panel 700–3000 VA Tower	SK-710-02871-00
LCD panel 700-3000 VA RM	SK-710-00938-02
EPO Relay card 700–3000 VA Tower & RM	SK-710-02863-01
Relay board 1000-1500 Tower & RM	SK-710-00953-00
O/P EMI & Relay board 700 Tower	SK-710-02232-00
Input EMI 700 VA Tower	SK-710-02895-00
Input EMI 1000-1500 VA Tower & RM	SK-710-00940-01
Input EMI 2000-3000 VA Tower	SK-710-02869-00
Input EMI 2000-3000 VA RM	SK-710-00944-00
Output EMI 2000-3000 Tower	SK-710-02867-00
Output EMI 2000-3000 RM	SK-710-00936-00

Powerware

Eaton® 9130 UPS
700–3000 VA
User's Guide

Class A EMC Statements
(Low Voltage Models over 1500 VA)

FCC Part 15

NOTE This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

ICES-003

This Class A Interference Causing Equipment meets all requirements of the Canadian Interference Causing Equipment Regulations ICES-003.

Cet appareil numérique de la classe A respecte toutes les exigences du Reglement sur le matériel brouilleur du Canada.

EN 62040-2

Some configurations are classified under EN 62040-2 as "Class-A UPS for Unrestricted Sales Distribution." For these configurations, the following applies:

WARNING This is a Class A-UPS Product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take additional measures.

VCCI Notice

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスA情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Eaton, Powerware, ABM, FERRUPS, and LanSafe are registered trademarks and ConnectUPS is a trademark of Eaton Corporation or its subsidiaries and affiliates. National Electrical Code and NEC are registered trademarks of National Fire Protection Association, Inc. Phillips is a registered trademark of Phillips Screw Company. All other trademarks are property of their respective companies.

©Copyright 2008 Eaton Corporation, Raleigh, NC, USA. All rights reserved. No part of this document may be reproduced in any way without the express written approval of Eaton Corporation.

Class B EMC Statements (Low Voltage Models up to 1500 VA and High Voltage Models up to 3000 VA)

FCC Part 15

NOTE This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

ICES-003

This Class B Interference Causing Equipment meets all requirements of the Canadian Interference Causing Equipment Regulations ICES-003.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement sur le matériel brouilleur du Canada.

VCCI Notice

この装置は、情報処理装置等電波障害自主規制協議会（VCCI）の基準に基づくクラスB情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

Requesting a Declaration of Conformity

Units that are labeled with a CE mark comply with the following harmonized standards and EU directives:

- Harmonized Standards: IEC 61000-3-12
- EU Directives: 73/23/EEC, Council Directive on equipment designed for use within certain voltage limits
  93/68/EEC, Amending Directive 73/23/EEC
  89/336/EEC, Council Directive relating to electromagnetic compatibility
  92/31/EEC, Amending Directive 89/336/EEC relating to EMC

The EC Declaration of Conformity is available upon request for products with a CE mark. For copies of the EC Declaration of Conformity, contact:

Eaton Power Quality Oy
Koskelontie 13
FIN-02920 Espoo
Finland
Phone: +358-9-452 661
Fax: +358-9-452 665 68

Special Symbols

The following are examples of symbols used on the UPS or accessories to alert you to important information:

RISK OF ELECTRIC SHOCK - Observe the warning associated with the risk of electric shock symbol.

CAUTION: REFER TO OPERATOR'S MANUAL - Refer to your operator's manual for additional information, such as important operating and maintenance instructions.

This symbol indicates that you should not discard the UPS or the UPS batteries in the trash. This product contains sealed, lead-acid batteries and must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center.

This symbol indicates that you should not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

Table of Contents

Chapter 1 Introduction

The Eaton® 9130 uninterruptible power system (UPS), part of the Powerware® series, protects your sensitive electronic equipment from the most common power problems, including power failures, power sags, power surges, brownouts, line noise, high voltage spikes, frequency variations, switching transients, and harmonic distortion.

Power outages can occur when you least expect it and power quality can be erratic. These power problems have the potential to corrupt critical data, destroy unsaved work sessions, and damage hardware — causing hours of lost productivity and expensive repairs.

With the Eaton 9130, you can safely eliminate the effects of power disturbances and guard the integrity of your equipment. Providing outstanding performance and reliability, the Eaton 9130's unique benefits include:

- True online double-conversion technology with high power density, utility frequency independence, and generator compatibility.
- ABM® technology that uses advanced battery management to increase battery service life, optimize recharge time, and provide a warning before the end of useful battery life.
- Selectable High Efficiency mode of operation.
- Rackmount models in a space-optimizing 2U size that fits any standard 48 cm (19") rack.
- Standard communication options: one RS-232 communication port, one USB communication port, and relay output contacts.
- Optional connectivity cards with enhanced communication capabilities.
- Optional modem capability for remote monitoring and service.
- Extended runtime with up to four Extended Battery Modules (EBMs) per UPS.
- Firmware that is easily upgradable without a service call.
- Emergency shutdown control through the Remote Emergency Power-off (REPO) port.
- Backed by worldwide agency approvals.

Figure 1 shows the Eaton 9130 rackmount UPS, and Figure 2 shows the optional rackmount EBM.

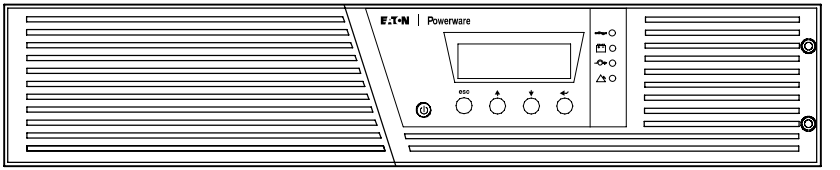


Figure 1. The Eaton 9130 Rackmount UPS

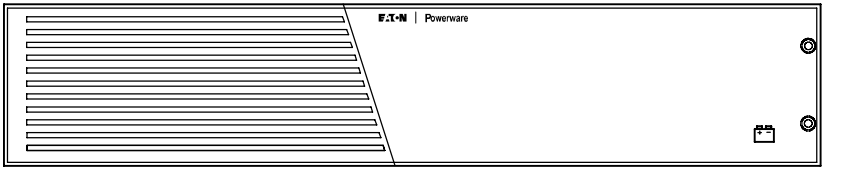


Figure 2. The Eaton 9130 Rackmount EBM

Figure 3 shows the Eaton 9130 tower UPS and optional EBM.

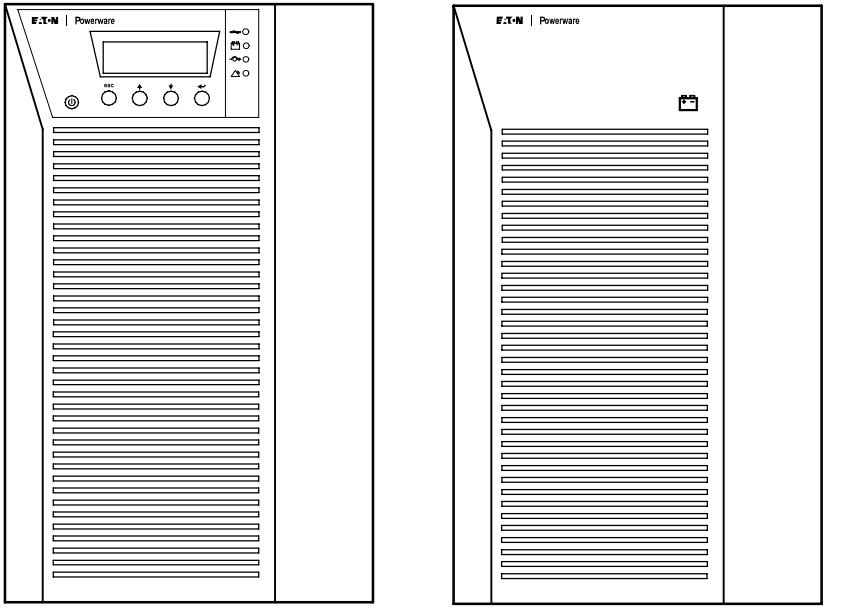


Figure 3. The Eaton 9130 Tower UPS and EBM (2000–3000 VA Models Shown)

Chapter 2 Safety Warnings

IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

This manual contains important instructions that you should follow during installation and maintenance of the UPS and batteries. Please read all instructions before operating the equipment and save this manual for future reference.

DANGER

This UPS contains **LETHAL VOLTAGES**. All repairs and service should be performed by **AUTHORIZED SERVICE PERSONNEL ONLY**. There are **NO USER SERVICEABLE PARTS** inside the UPS.

WARNING

- This UPS contains its own energy source (batteries). The UPS output may carry live voltage even when the UPS is not connected to an AC supply.
- To reduce the risk of fire or electric shock, install this UPS in a temperature and humidity controlled, indoor environment, free of conductive contaminants. Ambient temperature must not exceed 40°C (104°F). Do not operate near water or excessive humidity (90% maximum).
- To reduce the risk of fire, connect only to a circuit provided with branch circuit overcurrent protection in accordance with the National Electrical Code® (NEC®), ANSI/NFPA 70.
- Output overcurrent protection and disconnect switch must be provided by others.
- To comply with international standards and wiring regulations, the sum of the leakage current of the UPS and the total equipment connected to the output of this UPS must not have an earth leakage current greater than 3.5 milliamperes.
- If installing optional rackmount EBM(s), install the EBM(s) directly below the UPS so that all wiring between the cabinets is installed behind the front covers and is inaccessible to users. The maximum number of EBM(s) per UPS is four.
- If the UPS requires any type of transportation, verify that the UPS is unplugged and turned off and then disconnect the UPS internal battery connector (see Figure 24 on page 64 for rackmount models or Figure 26 on page 67 for tower models).

CAUTION

- Batteries can present a risk of electrical shock or burn from high short-circuit current. Observe proper precautions. Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Never dispose of batteries in a fire. Batteries may explode when exposed to flame.

Sikkerhedsanvisninger

VIGTIGE SIKKERHEDSANVISNINGER GEM DISSE ANVISNINGER

Denne manual indeholder vigtige instruktioner, som skal følges under installation og vedligeholdelse af UPS'en og batterierne. Læs venligst alle instruktioner inden betjening af udstyret og gem denne manual mhp. fremtidige opslag.

FARE

Denne UPS indeholder LIVSFARLIG HØJSPÆNDING. Alle reparationer og vedligeholdelse bør kun udføres af en AUTORISERET SERVICETEKNIKER. Ingen af UPS'ens indvendige dele kan repareres af brugeren.

ADVARSEL!

- Denne UPS indeholder sin egen energikilde (batterier). Udgangsstikket på UPS'en kan endog være strømførende, når UPS'en ikke er koblet til en vekselstrømsforsyning.
- Installér denne UPS i et temperatur- og fugtighedskontrolleret indendørsmiljø, frit for ledende forureningsstoffer for at formindske risikoen for brand og elektrisk stød. Rumtemperaturen må ikke overstige 40°C. UPS'en bør ikke betjenes nær vand eller høj fugtighed (maksimalt 90%).
- For at reducere risikoen for brand må tilkobling kun ske til et kredsløb forsynet med 100 ampere maks. linieforgrenings overbelastningsbeskyttelse i overensstemmelse med NEC, ANSI/NFPA 70.
- Udgangsoverbelastningsbeskyttelsen og afbryderkontakten skal leveres af andre.
- I overensstemmelse med internationale normer og bestemmelser for el-installation må det udstyr, der er forbundet til udgangen af denne UPS, tilsammen ikke overskride en jordafdelingsspænding på mere end 3,5 milliampere.

ADVARSEL

- Batterierne kan give risiko for elektrisk stød eller brandsår forårsaget af høj kortslutningsstrøm. Overhold gældende forsigtighedsregler. Servicering skal udføres af kvalificeret servicepersonale med kendskab til batterier og gældende forsigtighedsregler. Hold uautoriseret personale væk fra batterierne.
- Korrekt bortskaffelse af batterier er påkrævet. Overhold gældende lokale regler for bortskaffelsesprocedurer.
- Skaf dig aldrig af med batterierne ved at brænde dem. Batterierne kan eksplodere ved åben ild.

Belangrijke Veiligheidsinstructies

BELANGRIJKE VEILIGHEIDSINSTRUCTIES BEWAAR DEZE INSTRUCTIES

Deze handleiding bevat belangrijke instructies die u dient te volgen tijdens de installatie en het onderhoud van de UPS en de accu's. Lees alle instructies voordat u de apparatuur in bedrijf neemt en bewaar deze handleiding als naslagwerk.

GEVAAR

Deze UPS bevat LEVENSGEVAARLIJKE ELEKTRISCHE SPANNING. Alle reparaties en onderhoud dienen UITSLUITEND DOOR ERKEND SERVICEPERSONEEL te worden uitgevoerd. Er bevinden zich GEEN ONDERDELEN in de UPS die DOOR DE GEBRUIKER kunnen worden GEREPAREERD.

WAARSCHUWING

- Deze UPS bevat een eigen energiebron (accu's). De UPS-uitgang kan onder spanning staan, zelfs wanneer de UPS niet is aangesloten op de netspanning.
- Teneinde de kans op brand of elektrische schok te verminderen dient deze UPS in een gebouw met temperatuur- en vochtigheidregeling te worden geïnstalleerd, waar geen geleidende verontreinigingen aanwezig zijn. De omgevingstemperatuur mag 40°C niet overschrijden. Niet gebruiken in de buurt van water of bij zeer hoge vochtigheid (max. 90%).
- Sluit om brandgevaar te voorkomen de apparatuur uitsluitend aan op een circuit voorzien van een overstroombeveiliging voor vertakte circuits van maximaal 100 A in overeenstemming met de NEC (Nationale Elektriciteitsvoorschriften), ANSI/NFPA 70.

- De uitgangsoverstroombeveiliging en de stroomonderbreker moeten door derden worden geleverd.
- Om aan de internationale normen en bedradingsvoorschriften te voldoen mag de gehele apparatuur die op de uitgang van deze UPS is aangesloten, geen aardlekstroom van meer dan 3,5 milliampère hebben.

OPGELET

- Batterijen leveren gevaar op voor elektrische schokken en kunnen brandwonden veroorzaken door een grote kortsluitstroom. Neem de juiste voorzorgsmaatregelen in acht. Het onderhoud moet worden uitgevoerd door bevoegde onderhoudsmonteurs die verstand hebben van accu's en op de hoogte zijn van de vereiste voorzorgsmaatregelen. Houd onbevoegden uit de buurt van de accu's.
- De batterijen moeten op de juiste wijze worden opgeruimd. Raadpleeg hiervoor uw plaatselijke voorschriften.
- Nooit batterijen in het vuur gooien. De batterijen kunnen ontploffen.

Tarkeita Turvaohjeita

TÄRKEITÄ TURVAOHJEITA - SUOMI
SÄILYTÄ NÄMÄ OHJEET

Tämä käyttöohje sisältää tärkeitä ohjeita, joita on noudatettava UPS-virtalähteen ja akkujen asennuksen ja huollon yhteydessä. Lue kaikki ohjeet ennen laitteiston käyttöä ja säilytä ohje myöhempää tarvetta varten.

VAARA

Tämä UPS sisältää HENGENVAARALLISIA JÄNNITTEITÄ. Kaikki korjaukset ja huollot on jätettävä VAIN VALTUUTETUN HUOLTOHENKILÖN TOIMEKSI. UPS ei sisällä MITÄÄN KÄYTTÄJÄN HUOLLETTAVIA OSIA.

VAROITUS

- Tässä UPS-virtalähteessä on oma energianlähde (akut). UPS-virtalähteen lähdössä voi olla jännite, vaikka UPS-virtalähdettä ei ole kytketty verkkovirtaan.
- Vähentääksesi tulipalon ja sähköiskun vaaraa asenna tämä UPS sisätiloihin, joissa lämpötila ja kosteus on säädettävissä ja joissa ei ole virtaa johtavia epäpuhtauksia. Ympäristön lämpötila ei saa ylittää 40 °C. Älä käytä lähellä vettä ja vältä kosteita tiloja (95 % maksimi).

- Pienennä tulipalon vaaraa kytkemällä vain piiriin, jossa on 100 ampeerin maksimihaarapiirin ylivirtasuoja kansallisen sähkölainsäädännön (ANSI/NFPA 70) mukaan.
- Muiden on toimitettava lähdön ylivirtasuoja ja irtikytkentäkytkin.
- Kansainväliset normit ja johdotusmääräykset vaativat, että kaikkien tämän UPS-laitteen ulostulokytkentöjen yhteinen maavuotovirta ei ylitä 3,5 milliampeeria (mA).

VARO

- Akut voivat aiheuttaa sähköiskun tai palovammojen vaaran johtuen suuresta oikosulkuvirrasta. Noudata kaikkia asianmukaisia varotoimia. Laitteen saa huoltaa vain ammattitaitoinen huoltohenkilökunta, joka tuntee akut ja niihin liittyvät varotoimet. Älä päästä valtuuttamatonta henkilöstöä lähelle akkuja.
- Akusto täytyy hävittää säädösten mukaisella tavalla. Noudata paikallisia määräyksiä.
- Älä koskaan heitä akkuja tuleen. Ne voivat räjähtää.

Consignes de sécurité

CONSIGNES DE SÉCURITÉ IMPORTANTES CONSERVER CES INSTRUCTIONS

Ce manuel comporte des instructions importantes que vous êtes invité à suivre lors de toute procédure d'installation et de maintenance des batteries et de l'onduleur. Veuillez consulter entièrement ces instructions avant de faire fonctionner l'équipement et conserver ce manuel afin de pouvoir vous y reporter ultérieurement.

DANGER!

Cet onduleur contient des TENSIONS MORTELLES. Toute opération d'entretien et de réparation doit être EXCLUSIVEMENT CONFIÉE A UN PERSONNEL QUALIFIÉ AGRÉÉ. AUCUNE PIÈCE RÉPARABLE PAR L'UTILISATEUR ne se trouve dans l'onduleur.

AVERTISSEMENT!

- Cette onduleur possède sa propre source d'alimentation (batteries). Il est possible que la sortie de l'onduleur soit sous tension même lorsque l'onduleur n'est pas connectée à une alimentation CA.
- Pour réduire les risques d'incendie et de décharge électrique, installer l'onduleur uniquement à l'intérieur, dans un lieu dépourvu de matériaux conducteurs, où la température et l'humidité ambiantes sont contrôlées. La température ambiante ne doit pas dépasser 40 °C. Ne pas utiliser à proximité d'eau ou dans une atmosphère excessivement humide (95 % maximum).

- Afin de réduire les risques d'incendie, ne raccordez qu'à un circuit muni d'une protection de surintensité du circuit de dérivation maximum de 100 ampères conformément au NEC (Code Électrique National) des États-Unis, ANSI/NFPA 70.
- La protection de surintensité de sortie ainsi que le sectionneur doivent être fournis par des tiers.
- Afin d'être conforme aux normes et règlements internationaux de câblage, le courant de fuite à la terre de la totalité du matériel branché sur la sortie de l'onduleur ne doit pas dépasser 3,5 mA.

ATTENTION!

- Les batteries peuvent présenter un risque de choc électrique ou de brûlure provenant d'un courant de court-circuit haute intensité. Observez les précautions appropriées. L'entretien doit être réalisé par du personnel qualifié connaissant bien les batteries et les précautions nécessaires. N'autorisez aucun personnel non qualifié à manipuler les batteries.
- Une mise au rebut réglementaire des batteries est obligatoire. Consulter les règlements en vigueur dans votre localité.
- Ne jamais jeter les batteries au feu. L'exposition aux flammes risque de les faire exploser.

Sicherheitswarnungen

WICHTIGE SICHERHEITSANWEISUNGEN AUFBEWAREN

Dieses Handbuch enthält wichtige Anweisungen, die Sie während der Installation und Wartung des USV (Unterbrechungsfreies Stromversorgungssystem) und der Batterien befolgen müssen. Bitte lesen Sie alle Anweisungen des Handbuches bevor sie mit dem Gerät arbeiten. Bewaren Sie das Handbuch zum Nachlesen auf.

WARNUNG

Die USV führt lebensgefährliche Spannungen. Alle Reparatur- und Wartungsarbeiten sollten nur von Kundendienstfachleuten durchgeführt werden. Die USV enthält keine vom Benutzer zu wartenden Komponenten.

ACHTUNG

- Dieses USV (Unterbrechungsfreies Stromversorgungssystem) enthält eine eigene Energiequelle (Batterien). Der USV-Ausgang kann Spannung führen, auch wenn das USV nicht an eine Wechselstromquelle angeschlossen ist.
- Um die Brand- oder Elektroschockgefahr zu verringern, diese USV nur in Gebäuden mit kontrollierter Temperatur und Luftfeuchtigkeit installieren, in denen keine leitenden Schmutzstoffen vorhanden sind. Die Umgebungstemperatur darf 40°C nicht übersteigen. Die USV nicht in der Nähe von Wasser oder in extrem hoher Luftfeuchtigkeit (max. 95 %) betreiben.
- Um die Brandgefahr zu verringern, nur an eine Leitung anschließen, die mit einem Überlaststromschutz von maximal 100 Ampere in Übereinstimmung mit dem NEC, ANSI/NFPA 70 ausgestattet ist.
- Der Ausgangs-Überlaststromschutz und der Trennschalter müssen von anderen Herstellern geliefert werden.
- Um internationale Normen und Verdrahtungsvorschriften zu erfüllen, dürfen die an den Ausgang dieser USV angeschlossenen Geräte zusammen einen Erdableitstrom von insgesamt 3,5 Milliampere nicht überschreiten.

VORSICHT!

- Batterien können das Risiko eines elektrischen Schlags bergen oder durch hohen Kurzschlussstrom in Brand geraten. Die richtigen Vorsichtsmaßnahmen beachten. Die Wartung muss von qualifiziertem Wartungspersonal durchgeführt werden, das im Umgang mit Batterien geübt ist und über gute Kenntnisse der erforderlichen Vorsichtsmaßnahmen verfügt. Nicht autorisiertes Personal von Batterien fern halten.
- Die Batterien müssen ordnungsgemäß entsorgt werden. Hierbei sind die örtlichen Bestimmungen zu beachten.
- Batterien niemals verbrennen, da sie explodieren können.

Avvisi di sicurezza

IMPORTANTI ISTRUZIONI DI SICUREZZA CONSERVARE QUESTE ISTRUZIONI

Il presente manuale contiene importanti istruzioni da seguire durante l'installazione e la manutenzione dell'UPS e delle batterie. Leggere integralmente le istruzioni prima di utilizzare l'apparecchiatura e conservare il presente manuale per futuro riferimento.

PERICOLO

La TENSIONE contenuta in questo gruppo statico di continuità è LETALE. Tutte le operazioni di riparazione e di manutenzione devono essere effettuate ESCLUSIVAMENTE DA PERSONALE TECNICO AUTORIZZATO. All'interno del gruppo statico di continuità NON vi sono PARTI RIPARABILI DALL'UTENTE.

AVVERTENZA

- L'UPS contiene la propria fonte di energia (batterie). Le prese d'uscita dell'UPS possono essere sotto tensione anche quando l'UPS non è collegato all'alimentazione elettrica CA.
- Per ridurre il rischio di incendio o di scossa elettrica, installare il gruppo statico di continuità in un ambiente interno a temperatura ed umidità controllata, privo di agenti contaminanti conduttivi. La temperatura ambiente non deve superare i 40°C. Non utilizzare l'unità in prossimità di acqua o in presenza di umidità eccessiva (90% max).
- Per ridurre il rischio di incendio, effettuare il collegamento soltanto a un circuito dotato di una protezione da sovraccarico per il circuito derivato di max. 100 ampere come stabilito dalle norme statunitensi sugli impianti elettrici (NEC, ANSI/NFPA 70).
- La protezione da sovraccarico per le uscite e l'interruttore di scollegamento devono essere forniti da altri produttori.
- Per conformità con gli standard internazionali e con le norme in merito al cablaggio, tutta l'apparecchiatura collegata con l'uscita del gruppo statico di continuità non deve avere una corrente di dispersione di terra superiore a 3,5 milliampere.

ATTENZIONE

- Le batterie possono comportare un rischio di scossa elettrica o di ustione in seguito a un'elevata corrente di corto circuito. Osservare le dovute precauzioni. L'assistenza deve essere eseguita da personale qualificato esperto di batterie e delle necessarie precauzioni. Tenere il personale non autorizzato lontano dalle batterie.
- Le batterie devono essere smaltite in modo corretto. Per i requisiti di smaltimento fare riferimento alle disposizioni locali.
- Non gettare mai le batterie nel fuoco poichè potrebbero esplodere se esposte alle fiamme.

Viktig Sikkerhetsinformasion

VIKTIGE SIKKERHETSINSTRUKSJONER
GJEM DISSE INSTRUKSJONENE

Denne håndboken inneholder viktige instruksjoner som du bør overholde ved montering og vedlikehold av UPS-enheten og batteriene. Les alle instruksjoner før utstyret tas i bruk, og gjem håndboken til fremtidig referanse.

FARLIG

Denne UPS'en inneholder LIVSFARLIGE SPENNINGER. All reparasjon og service må kun utføres av AUTORISERT SERVICEPERSONALE. BRUKERE KAN IKKE UTFØRE SERVICE PÅ NOEN AV DELENE i UPS'en.

FARLIG

- UPS-enheten inneholder sin egen energikilde (batterier). UPS-utgangen kan være strømførende selv når UPS-enheten ikke er koblet til et strømuttak.
- For å redusere fare for brann eller elektriske støt, bør denne UPS'en installeres i et innendørs miljø med kontrollert temperatur og luftfuktighet som er fritt for ledende, forurensende stoffer. Romtemperaturen må ikke overskride 40°C. Den må ikke brukes i nærheten av vann eller ved meget høy luftfuktighet (90% maks.).
- For å redusere brannfaren skal det bare kobles til et kretsløp med 100 A maksimum linjeforgrenings overbelastningsbeskyttelse i henhold til NEC, ANSI/NFPA 70.
- Overbelastningsbeskyttelse for strømutgang og bryterkontakt skal leveres av andre.
- Alt utstyr som er forbundet med utgangen av denne UPS'en må ikke ha en sterkere total lekkasjestrøm enn 3,5 milliampere for å være i overensstemmelse med internasjonale standarder og forkablingsbestemmelser.

FORSIKTIG

- Batterier kan utgjøre en fare for elektrisk støt eller brannsår pga. høy kortsluttingsstrøm. Treff passende forholdsregler. Service bør utføres av kvalifisert servicepersonale med kjennskap til batterier og nødvendige forholdsregler. Hold uautorisert personale borte fra batteriene.
- Batterier må fjernes på korrekt måte. Se lokale forskrifter vedrørende krav om fjerning av batterier.
- Kast aldri batterier i flammer, da de kan eksplodere, hvis de utsettes for åpen ild.

Regulamentos de Segurança

INSTRUÇÕES DE SEGURANÇA IMPORTANTES GUARDE ESTAS INSTRUÇÕES

Este manual contém instruções importantes que devem ser seguidas durante a instalação e manutenção do no-break e das baterias. Leia todas as instruções antes de operar o equipamento e guarde este manual para consultá-lo futuramente.

CUIDADO

A UPS contém VOLTAGEM MORTAL. Todos os reparos e assistência técnica devem ser executados SOMENTE POR PESSOAL DA ASSISTÊNCIA TÉCNICA AUTORIZADO. Não há nenhuma PEÇA QUE POSSA SER REPARADA PELO USUÁRIO dentro da UPS.

ADVERTÊNCIA

- Este no-break possui sua própria fonte de energia (baterias). A saída do no-break pode estar energizada mesmo que este não esteja conectado a uma fonte de energia elétrica.
- Para reduzir o risco de incêndios ou choques elétricos, instale a UPS em ambiente interno com temperatura e umidade controladas e livres de contaminadores condutíveis. A temperatura ambiente não deve exceder 40°C. Não opere próximo a água ou em umidade excessiva (máx: 90%).
- Para reduzir o risco de incêndio, conecte somente ao circuito fornecido com a proteção máxima de 100 ampères contra a sobretensão do circuito derivado, de acordo com a norma ANSI/NFPA 70 do NEC.
- A proteção contra a sobretensão de saída e o disjuntor deve ser fornecida por terceiros.
- Para estar de acordo com os padrões internacionais e os regulamentos de fiação, o equipamento total conectado à saída desta UPS não deve ter uma corrente de fuga à terra maior que 3,5 miliampères.

PERIGO

- As baterias podem oferecer risco de choque elétrico ou queimadura, ocasionados por alta tensão com possibilidade de curto-circuito. Tome as precauções adequadas. A manutenção deve ser realizada por pessoal qualificado, com conhecimento sobre baterias e ciente das precauções exigidas. Mantenha o pessoal não autorizado afastado das baterias.
- Siga as instruções apropriadas ao desfazer-se das baterias. Consulte os códigos do local para maiores informações sobre os regulamentos de descarte de produtos.
- Nunca jogue as baterias no fogo, porque há risco de explosão.

Предупреждения по мерам безопасности

ВАЖНЫЕ УКАЗАНИЯ ПО МЕРАМ БЕЗОПАСНОСТИ СОХРАНИТЕ ЭТИ УКАЗАНИЯ

В данном руководстве содержатся важные инструкции по установке и обслуживанию источника бесперебойного питания (ИБП) и батарей. Перед работой с оборудованием прочтите все инструкции. Сохраните данное руководство для дальнейшего использования.

ОПАСНО

В данном ИБП имеются СМЕРТЕЛЬНО ОПАСНЫЕ НАПРЯЖЕНИЯ. Все работы по ремонту и обслуживанию должны выполняться ТОЛЬКО УПОЛНОМОЧЕННЫМ ОБСЛУЖИВАЮЩИМ ПЕРСОНАЛОМ. Внутри ИБП нет узлов, ОБСЛУЖИВАЕМЫХ ПОЛЬЗОВАТЕЛЕМ.

ПРЕДУПРЕЖДЕНИЕ

- **В данном ИБП установлены собственные источники энергии (батареи). В ИБП может иметься напряжение даже в том случае, если он не подключен к сети переменного тока.**
- **Для снижения опасности пожара или поражения электрическим током устанавливайте ИБП в закрытом помещении с контролируемыми температурой и влажностью, в котором отсутствуют проводящие загрязняющие вещества. Температура окружающего воздуха не должна превышать 40°C. Не эксплуатируйте устройство около воды или в местах с повышенной влажностью (макс. 90%).**
- **Для того чтобы снизить риск возникновения пожара, при подключении используйте электрическую цепь, снабженную защитой от перегрузки параллельной цепи с максимальной силой тока 100 А (в соответствии с Национальными электротехническими правилами и нормами ANSI / NFPA 70).**
- **Устройство защиты от перегрузки выходного напряжения и размыкающий переключатель приобретаются отдельно.**
- **Для обеспечения соблюдения требований международных стандартов и требований к разводке электрических цепей, суммарная величина тока утечки на землю всего оборудования, подключенного к выходу ИБП, не должна превышать 3,5 миллиампера.**

ОСТОРОЖНО

- **Высокое напряжение, вызванное коротким замыканием в батарее, может привести к поражению электрическим током или ожогу. Соблюдайте меры предосторожности. Техническое обслуживание должно осуществляться квалифицированным персоналом по работе с источниками питания, знакомым с мерами предосторожности. Не допускайте к работе с батареями посторонних.**
- **Необходимо соблюдать правила утилизации аккумуляторов. Обратитесь к местным нормативным актам за информацией о требованиях к утилизации.**
- **Никогда не бросайте аккумуляторы в огонь. Аккумуляторы могут взорваться под воздействием огня.**

Advertencias de Seguridad

INSTRUCCIONES DE SEGURIDAD IMPORTANTES GUARDE ESTAS INSTRUCCIONES

Este manual contiene instrucciones importantes que debe seguir durante la instalación y el mantenimiento del SIE y de las baterías. Por favor, lea todas las instrucciones antes de poner en funcionamiento el equipo y guarde este manual para referencia en el futuro.

PELIGRO

Este SIE contiene VOLTAJES MORTALES. Todas las reparaciones y el servicio técnico deben ser efectuados SOLAMENTE POR PERSONAL DE SERVICIO TÉCNICO AUTORIZADO. No hay NINGUNA PARTE QUE EL USUARIO PUEDA REPARAR dentro del SIE.

ADVERTENCIA

- Este SIE contiene su propia fuente de energía (baterías). La salida del SIE puede transportar voltaje activo aun cuando el SIE no esté conectado con una fuente de CA.
- Para reducir el riesgo de incendio o de choque eléctrico, instale este SIE en un lugar cubierto, con temperatura y humedad controladas, libre de contaminantes conductores. La temperatura ambiente no debe exceder los 40°C. No trabaje cerca del agua o con humedad excesiva (90% máximo).
- Para reducir el riesgo de incendio, realice la conexión únicamente hacia un circuito que cuente con un máximo de 100 amperios de protección contra sobrecorriente de circuito derivado, de acuerdo con el Código Eléctrico Nacional, ANSI/NFPA 70.

- La protección contra sobrecorriente de salida y el conmutador de desconexión debe suministrarse por parte de terceros.
- Para cumplir con los estándares internacionales y las normas de instalación, la totalidad de los equipos conectados a la salida de este SIE no debe tener una intensidad de pérdida a tierra superior a los 3,5 miliamperios.

PRECAUCIÓN

- Las baterías pueden constituir un riesgo de descarga eléctrica o quemaduras por corriente alta de corto circuito. Adopte las precauciones debidas. Personal calificado de servicio que conozca de baterías y esté al tanto de las precauciones requeridas debe darle servicio al equipo. Mantenga al personal no autorizado alejado de las baterías.
- Es necesario desechar las baterías de un modo adecuado. Consulte las normas locales para conocer los requisitos pertinentes.
- Nunca deseche las baterías en el fuego. Las baterías pueden explotar si se las expone a la llama.

Säkerhetsföreskrifter

VIKTIGA SÄKERHETSFÖRESKRIFTER SPARA DESSA FÖRESKRIFTER

Den här anvisningen innehåller viktiga instruktioner som du ska följa under installation och underhåll av UPS-enheten och batterierna. Läs alla instruktioner innan du använder utrustningen och spara den här anvisningen för framtida referens.

FARA

Denna UPS-enhet innehåller LIVSFARLIG SPÄNNING. ENDAST AUKTORISERAD SERVICEPERSONAL får utföra reparationer eller service. Det finns inga delar som ANVÄNDAREN KAN UTFÖRA SERVICE PÅ inuti UPS-enheten.

VARNING

- Den här UPS-enheten innehåller sin egen energikälla (batterier). UPS-enhetens uttag kan vara spänningsförande även då UPS-enheten inte är ansluten till spänningsnätet.
- Minska risken för brand eller elektriska stötar genom att installera denna UPS-enhet inomhus, där temperatur och luftfuktighet är kontrollerade och där inga ledande föroreningar förekommer. Omgivande temperatur får ej överstiga 40°C. Använd inte utrustningen nära vatten eller vid hög luftfuktighet (max 95 %).

- För att reducera faran för brand får anslutning endast utföras till en krets som skyddas med överbelastningsskydd på maximalt 100 ampere i enlighet med NEC, ANSI/NFPA 70.
- Utgående överbelastningssydd och kretsbrytare måste levereras av annan leverantör.
- För att överensstämma med internationell standard och installationsföreskrifter får inte den totala utrustning som anslutits till uttagen på denna UPS-enhet ha läcksström som överstiger 3,5 milliampere.

VIKTIGT

- Batterierna kan innebära en risk för elektrisk stöt eller brännskada från kortsluten starkström. lakttag lämpliga försiktighetsåtgärder. Service ska utföras av utbildad servicepersonal med kunskap om batterierna och nödvändiga försiktighetsåtgärder. Håll ej behörig personal borta från batterierna.
- Batterierna måste avyttras enligt anvisningarna i lokal lagstiftning.
- Använda batterier får aldrig brännas upp. De kan explodera.

Chapter 3 Installation

This section explains:

- Equipment inspection
- Unpacking the cabinet
- Checking the accessory kit
- Cabinet installation (rackmount and tower)
- Wiring installation
- Initial startup

Inspecting the Equipment

If any equipment has been damaged during shipment, keep the shipping cartons and packing materials for the carrier or place of purchase and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

To file a claim for shipping damage or concealed damage: 1) File with the carrier within 15 days of receipt of the equipment; 2) Send a copy of the damage claim within 15 days to your service representative.

NOTE *Check the battery recharge date on the shipping carton label. If the date has passed and the batteries were never recharged, do not use the UPS. Contact your service representative.*

Unpacking the Cabinet

CAUTION

- Unpacking the cabinet in a low-temperature environment may cause condensation to occur in and on the cabinet. Do not install the cabinet until the inside and outside of the cabinet are absolutely dry (hazard of electric shock).
- The cabinet is heavy (see page 78). Use caution to unpack and move the cabinet.

Use care when moving and opening the carton. Leave the components packaged until ready to install.

To unpack the cabinet and accessories:

1. Open the outer carton and remove the accessories packaged with the cabinet.
2. Carefully lift the cabinet out of the outer carton.
3. Discard or recycle the packaging in a responsible manner, or store it for future use.

Place the cabinet in a protected area that has adequate airflow and is free of humidity, flammable gas, and corrosion.

Checking the Accessory Kit

Verify that the following additional items are included with the UPS:

- UPS user's guide
- Quick start instructions
- Software Suite CD
- USB cable
- Power cord (for models without an attached power cord)

If you ordered an optional Extended Battery Module (EBM), verify that the following additional item is included with the EBM:

- EBM user's guide

NOTE *Discard the EBM user's guide if you are installing the EBM with a new UPS at the same time. Use the UPS user's guide to install both the UPS and the EBM.*

Rackmount Installation

The Eaton 9130 rackmount cabinet comes with all of the hardware required for installation in a standard EIA or JIS seismic rackmount configuration with square and round mounting holes. The rail assemblies adjust to mount in 48-cm (19-inch) racks with front to rear rail distances from 61 to 76 cm (24 to 30 inches) deep.

Checking the Rail Kit Accessories

Verify that the following rail kit items are included for each cabinet:

- Left rail assembly:
  - Left rail
  - Rear rail
  - (3) M4 × 8 pan-head screws
- Right rail assembly:
  - Right rail
  - Rear rail
  - (3) M4 × 8 pan-head screws
- Rail hardware kit:
  - (10) M6 × 16 pan-head screws
  - (10) M6 cage nuts
  - (2) rear stop brackets
  - (2) M3 × 8 pan-head screws
- Mounting bracket kit:
  - (2) mounting brackets
  - (8) M4 × 8 flat-head screws

Tools Required

To assemble the components, the following tools may be needed:

- Medium flat-bladed screwdriver
- Phillips® #2 screwdriver
- 7 and 8 mm wrench or socket

Rackmount Setup

CAUTION

- The cabinet is heavy (see page 78). Removing the cabinet from its carton requires a minimum of two people.
- If installing optional EBM(s), install the EBM(s) directly below the UPS so that all wiring between the cabinets is installed behind the front covers and is inaccessible to users.

NOTE *Mounting rails are required for each individual cabinet.*

To install the rail kit:

1. Assemble the left and right rails to the rear rails as shown in Figure 4. Do not tighten the screws.

Adjust each rail size for the depth of your rack.

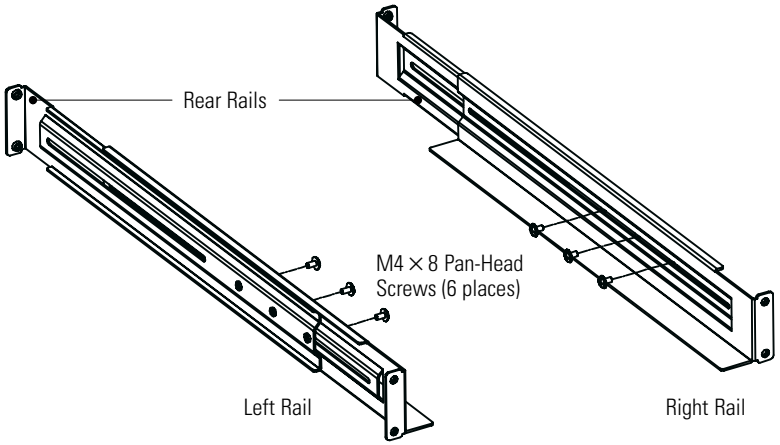


Figure 4. Assembling the Rails

2. Select the proper holes in the rack for positioning the UPS in the rack (see Figure 5). The rails occupy four positions on the front and rear of the rack.

3. Secure one rail assembly to the front of the rack with one M6 × 16 pan-head screw and one M6 cage nut.

4. Using two M6 cage nuts and two M6 × 16 pan-head screws, attach the rail assembly to the rear of the rack.

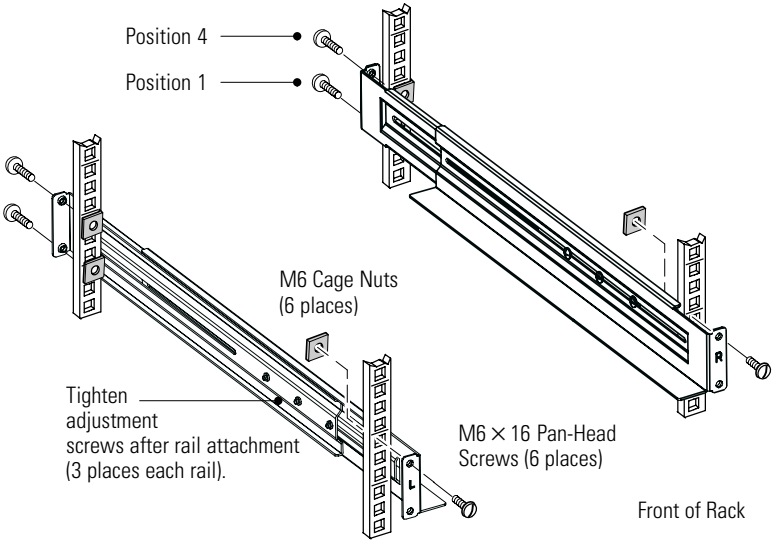


Figure 5. Securing the Rails

5. Repeat Steps 3 and 4 for the other rail assembly.

6. Tighten the three adjustment screws in the middle of each rail assembly.

7. If installing optional cabinets, repeat Step 1 through Step 6 for each rail kit.

8. Place the UPS on a flat, stable surface with the front of the cabinet facing you.

9. Align the mounting brackets with the screw holes on each side of the UPS and secure with the supplied M4 × 8 flat-head screws (see Figure 6).

NOTE *There are two sets of four mounting holes on each side of the UPS: a forward position and a middle position. Choose the position that meets your configuration needs.*

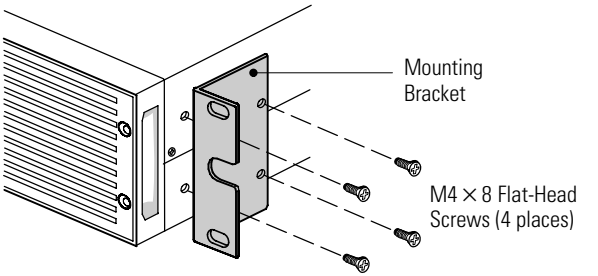


Figure 6. Installing the Mounting Brackets (Forward Position Shown)

10. If installing optional cabinets, repeat Steps 8 and 9 for each cabinet.

11. Slide the UPS and any optional cabinets into the rack.

12. Secure the front of the UPS to the rack using two M6 × 16 pan-head screws and two M6 cage nuts on each side (see Figure 7). Install the bottom screw on each side through the bottom hole of the mounting bracket and the bottom hole of the rail.

Repeat for any optional cabinets.

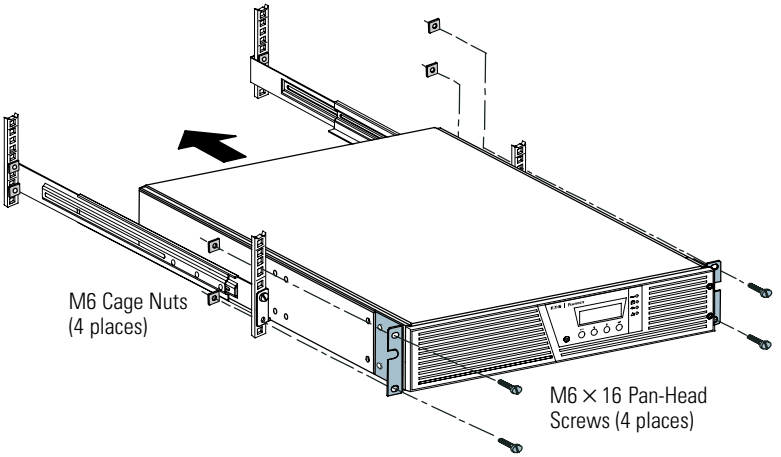


Figure 7. Securing the Front of the Cabinet

13. **Optional.** Insert a rear stop bracket through the inside of each rail behind the UPS. Rotate each bracket and slide the bracket until it fits tightly against the UPS's rear panel. Secure each bracket to the UPS with one M3 × 8 pan-head screw. See Figure 8.

    Repeat for any optional cabinets.

14. Continue to the following section, "Rackmount Wiring Installation."

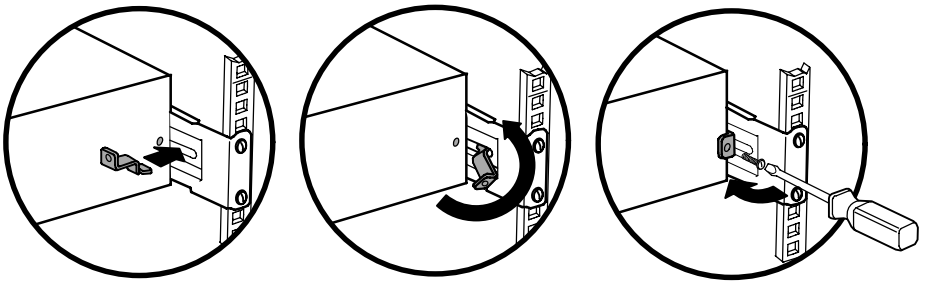


Figure 8. Securing the Back of the Cabinet (Optional)

Rackmount Wiring Installation

This section explains:

- Installing the UPS, including connecting the UPS internal batteries
- Connecting any optional EBMs

Installing the UPS

NOTE *Do not make unauthorized changes to the UPS; otherwise, damage may occur to your equipment and void your warranty.*

NOTE *Do not connect the UPS power cord to utility until after installation is completed.*

To install the UPS:

1. Remove the UPS right front cover (behind the LCD control panel). See Figure 9.

   To remove the cover, remove and retain the two screws on the right side of the cover. Grasp the top and bottom of the cover and slide the cover to the **right**.

NOTE *A ribbon cable connects the LCD control panel to the UPS. Do not pull on the cable or disconnect it.*

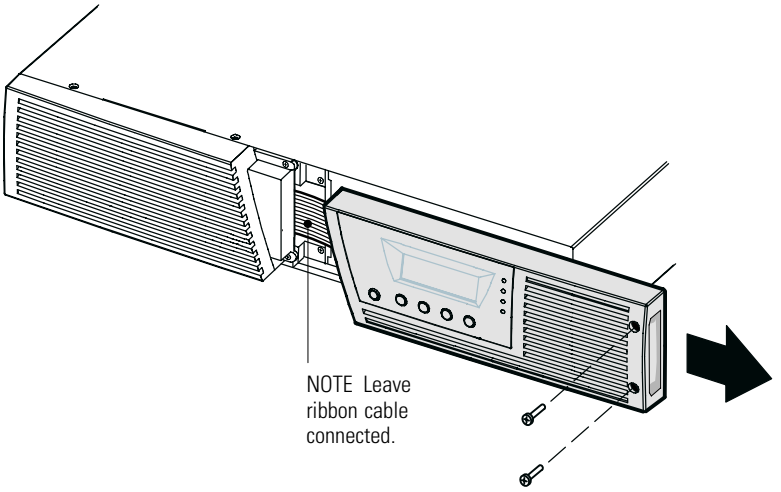


Figure 9. Removing the UPS Right Front Cover

CAUTION

A small amount of arcing may occur when connecting the internal batteries. This is normal and will not harm personnel. Connect the cables quickly and firmly.

2. Connect the internal battery connector (see Figure 10).

Up to 1500 VA models. Unclip the top rightmost white connector from the battery panel and move it to the left to connect to the white connector at the top left. Connect red to red, and black to black. Press the two parts tightly together to ensure a proper connection. Clip the wires of the rightmost connector to the battery panel in its new position.

2000–3000 VA models. Connect red to red, and black to black. Press the two parts tightly together to ensure a proper connection.

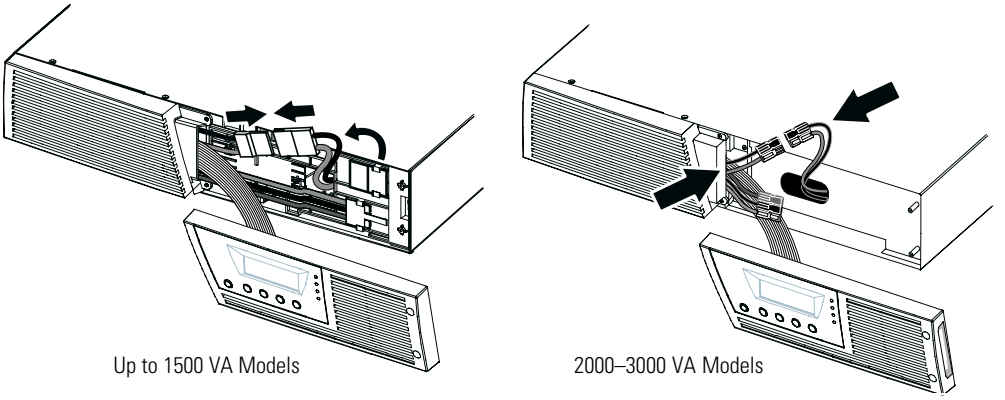


Figure 10. Connecting the UPS Internal Batteries

3. If you are installing EBMs, see the following section, "Connecting the EBM(s)," before continuing with the UPS installation.

4. Replace the UPS right front cover.

   To replace the cover, verify that the ribbon cable is protected and (if EBMs are installed) the EBM cable is routed through the knockout on the bottom of the cover. Slide the cover to the left until it aligns with the left front cover. Reinstall the two screws on the right side of the right front cover.

5. If you are installing power management software, connect your computer to one of the communication ports or optional connectivity card (see page 53). For the communication ports, use an appropriate cable (not supplied).

6. If your rack has conductors for grounding or bonding of ungrounded metal parts, connect the ground cable (not supplied) to the ground bonding screw. See "Rear Panels" on page 91 for the location of the ground bonding screw for each model.

7. If an emergency power-off (disconnect) switch is required by local codes, see "Remote Emergency Power-off" (REPO) on page 56 to install the REPO switch before powering on the UPS.

8. Continue to "UPS Initial Startup" on page 34.

Connecting the EBM(s)

To install the optional EBM(s) for a UPS:

1. On the bottom of the UPS right front cover, remove the EBM cable knockout (see Figure 11).

NOTE *Use care to protect the LCD control panel and the connected ribbon cable from damage.*

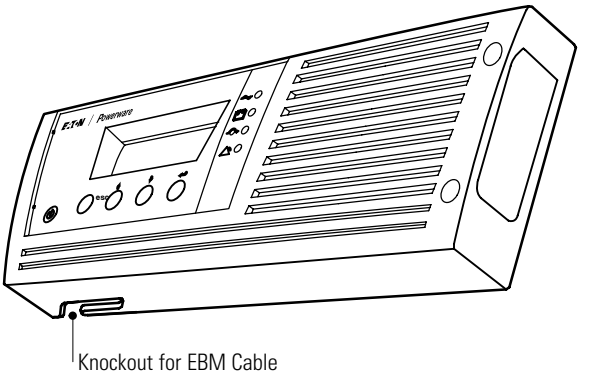


Figure 11. Removing the EBM Cable Knockout

2. Remove the front cover of each EBM (see Figure 12).

   To remove the cover, remove and retain the two screws on the right side of the cover. Grasp the sides of the cover and slide the cover to the **left** and then away from the cabinet.

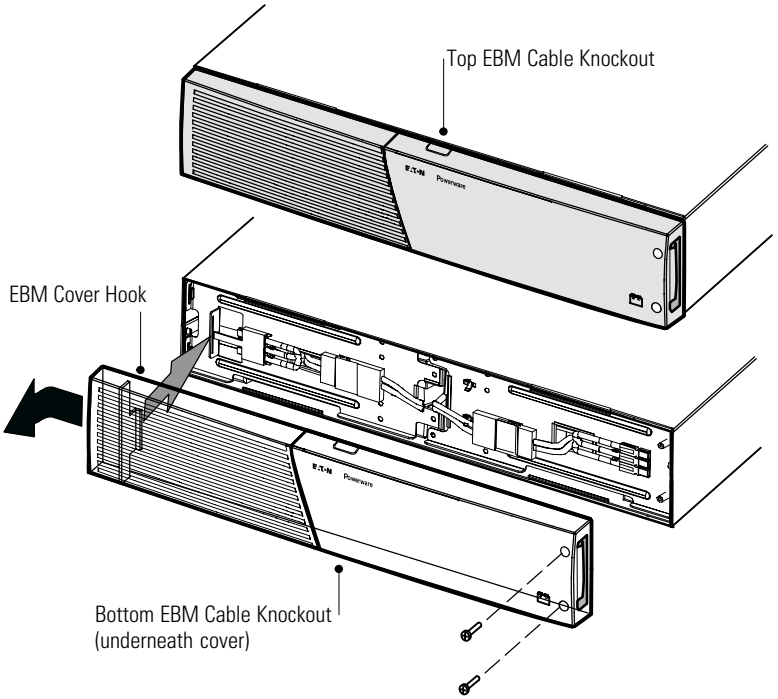


Figure 12. Removing the EBM Front Cover

3. For the bottom (or only) EBM, remove the EBM cable knockout on the top of the EBM front cover. See Figure 12 for the location of the top EBM cable knockout.

4. If you are installing more than one EBM, for each additional EBM remove the EBM cable knockout on the top **and** bottom of the EBM front cover. See Figure 12 for the location of the EBM cable knockouts.

CAUTION

A small amount of arcing may occur when connecting an EBM to the UPS. This is normal and will not harm personnel. Insert the EBM cable into the UPS battery connector quickly and firmly.

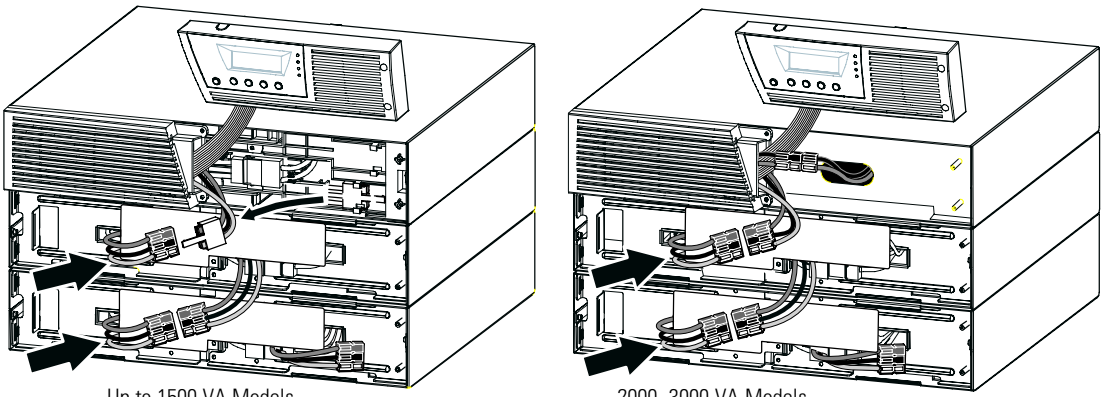
5. Plug the EBM cable(s) into the battery connector(s) as shown in Figure 13. Up to four EBMs may be connected to the UPS.

   Up to 1500 VA models. Unclip the EBM connector on the UPS battery panel and connect it to the EBM connector on the EBM. Press the two parts tightly together to ensure a proper connection.

   2000–3000 VA models. Connect red to red, black to black, and green to green. Press the two parts tightly together to ensure a proper connection.

   All models. To connect a second EBM, unclip the EBM connector on the first EBM and pull gently to extend the wiring to the EBM connector on the second EBM. Repeat for any additional EBMs.

6. Verify that the EBM connections are tight and that adequate bend radius and strain relief exist for each cable.



Up to 1500 VA Models

2000–3000 VA Models

Figure 13. Typical EBM Installation

7. Replace the EBM front cover.

   To replace the cover, verify that the EBM cables are routed through the EBM cover knockouts, then slide the cover from the left to the right until it connects with the cover hook near the left side of the EBM cabinet. Reinstall the two screws on the right side of the front cover. For reference, see Figure 12 on page 27.

   Repeat for each additional EBM.

8. Verify that all wiring connecting the UPS and EBM(s) is installed behind the front covers and is inaccessible to users.

9. Return to Step 4 on page 25 to continue the UPS installation.

Tower Installation

The Eaton 9130 tower cabinet comes fully assembled and ready to connect.

CAUTION

The cabinet is heavy (see page 78). Removing the cabinet from its carton requires a minimum of two people.

To install the cabinet:

1. Place the UPS on a flat, stable surface in its final location.

2. If installing additional cabinets, place them next to the UPS in their final location.

3. Continue to the following section, "Tower Wiring Installation."

Tower Wiring Installation

This section explains:

- Installing the UPS, including connecting the UPS internal batteries
- Connecting any optional EBMs

Installing the UPS

NOTE *Do not make unauthorized changes to the UPS; otherwise, damage may occur to your equipment and void your warranty.*

NOTE *Do not connect the UPS power cord to utility until after installation is completed.*

To install the UPS:

1. Remove the UPS front cover (see Figure 14).

To remove the cover, push down on the top of the cover and pull the cover toward you to unclip it from the cabinet.

NOTE *A ribbon cable connects the LCD control panel to the UPS. Do not pull on the cable or disconnect it.*

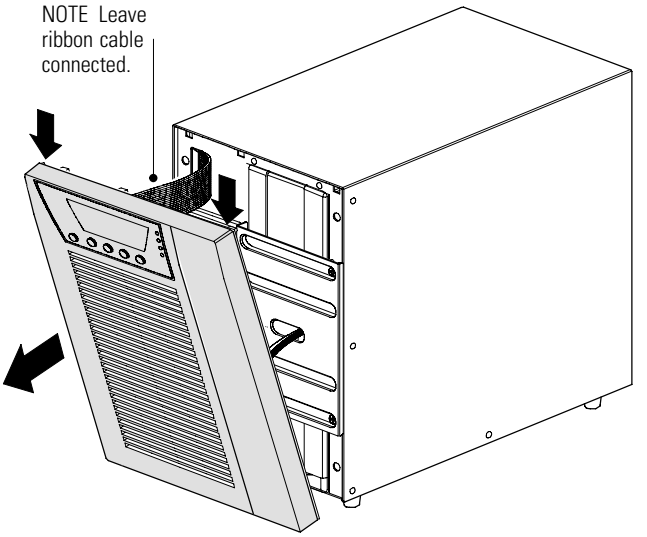


Figure 14. Removing the UPS Front Cover

CAUTION

A small amount of arcing may occur when connecting the internal batteries. This is normal and will not harm personnel. Connect the cables quickly and firmly.

2. Connect the internal battery connector (see Figure 15).

Connect the white connectors together, connecting red to red, and black to black. Press the two parts tightly together to ensure a proper connection.

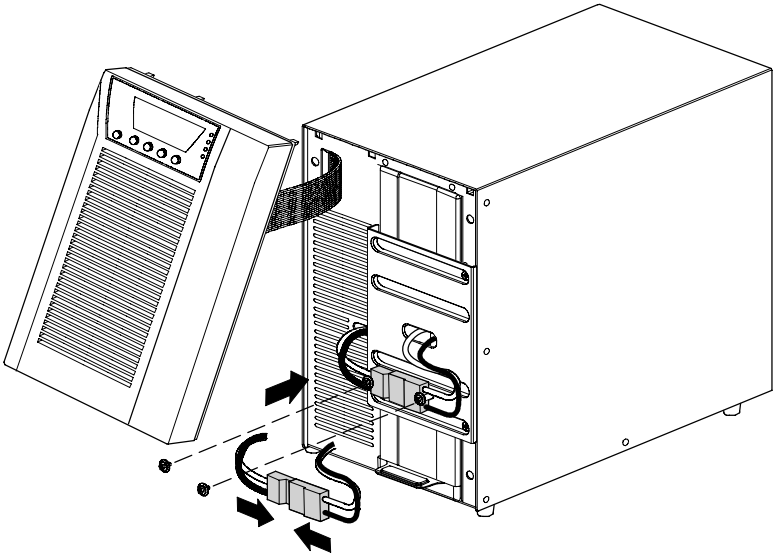


Figure 15. Connecting the UPS Internal Batteries

3. Remove the two screws from the screw mounts and retain (see Figure 15).

4. Place the battery connector between the screw mounts. Reinstall the two screws to hold the connector in place.

5. Replace the UPS front cover.

To replace the cover, verify that the ribbon cable is protected, then insert the clips on the back of the cover into the cabinet and push firmly to snap the cover into place.

6. If you are installing power management software, connect your computer to one of the communication ports or optional connectivity card (see page 53). For the communication ports, use an appropriate cable (not supplied).

7. If an emergency power-off (disconnect) switch is required by local codes, see "Remote Emergency Power-off" (REPO) on page 56 to install the REPO switch before powering on the UPS.

8. If you are installing EBM(s), continue to the following section, "Connecting the EBM(s)." Otherwise, continue to "UPS Initial Startup" on page 34.

Connecting the EBM(s)

To install the optional EBM(s) for a UPS:

1. On the rear of the UPS, remove the cable retention clip covering the battery connector. Retain the clip and screws. See Figure 16.

2. **Installations with one EBM only.** Remove the cable retention clip covering the right (for 1000–1500 VA models) or upper (for 2000–3000 VA models) battery connector. Retain the clip and screws.

3. **Installations with more than one EBM.** For all EBMs except the last EBM, remove the cable retention clips covering both battery connectors. Do not remove the clip from the second battery connector on the last EBM. Retain the clips and screws.

CAUTION

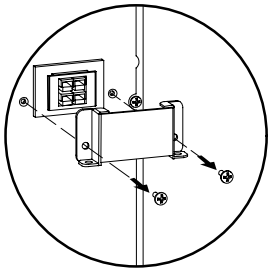
A small amount of arcing may occur when connecting an EBM to the UPS. This is normal and will not harm personnel. Insert the EBM cable into the UPS battery connector quickly and firmly.

4. Plug the EBM cable(s) into the battery connector(s) as shown in Figure 16. Up to four EBMs may be connected to the UPS.

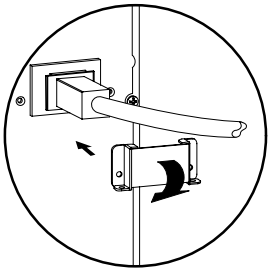
5. For each cable retention clip removed, rotate the clip and install it under each EBM cable connection using the retained screws.

6. Verify that the EBM connections are tight and that adequate bend radius and strain relief exist for each cable.

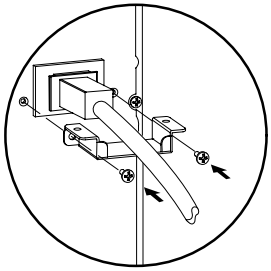
7. Continue to "UPS Initial Startup" on page 34.



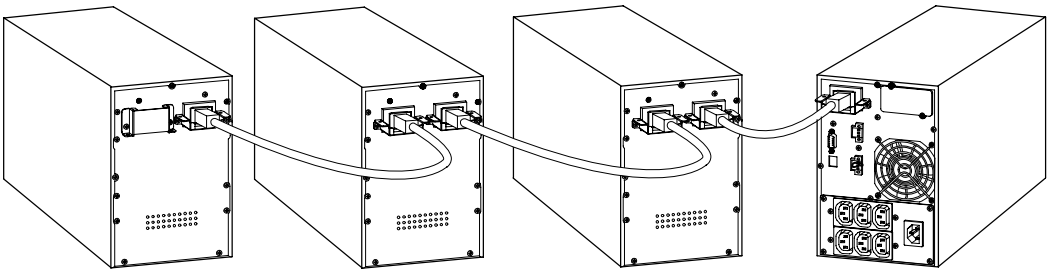
Remove cable retention clip.



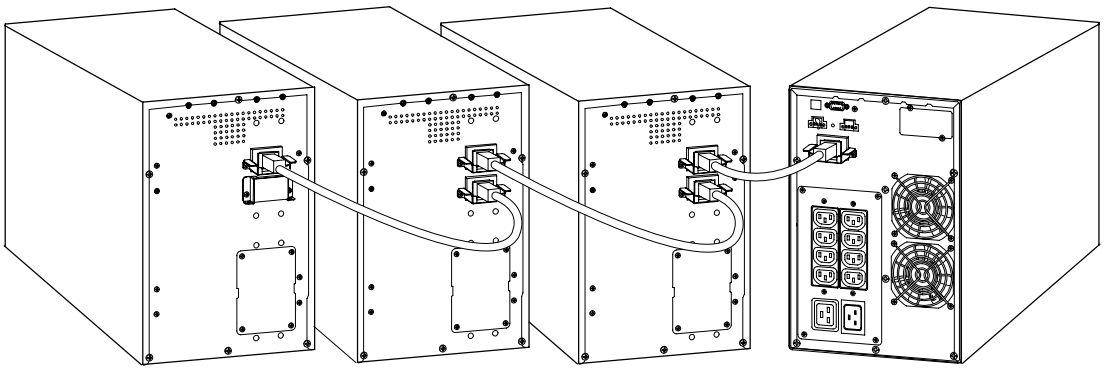
Plug in EBM cable. Rotate clip.



Reinstall cable retention clip.



1000–1500 VA Models



2000–3000 VA Models

Figure 16. Connecting the EBMs

UPS Initial Startup

To start up the UPS:

NOTE *Verify that the total equipment ratings do not exceed the UPS capacity to prevent an overload alarm.*

1. Verify that the internal batteries are connected.

   Rack models. See "Installing the UPS" on page 23.

   Tower models. See "Installing the UPS" on page 30.

2. If optional EBMs are installed, verify that the EBMs are connected to the UPS.

   Rack models. See "Connecting the EBM(s)" on page 26.

   Tower models. See "Connecting the EBM(s)" on page 32.

3. Plug the equipment to be protected into the UPS, but do not turn on the protected equipment.

4. Make any necessary provisions for cord retention and strain relief.

5. **Models without an attached power cord.** Plug the detachable UPS power cord into the input connector on the UPS rear panel.

6. Plug the UPS power cord into a power outlet.

   The UPS front panel display illuminates and shows a status of "UPS initializing..."

7. Verify that the UPS transfers to Standby mode ("UPS on standby").

8. Press the ⏻ button on the UPS front panel for at least one second.

   The UPS front panel display changes status to "UPS starting..."

9. Check the UPS front panel display for active alarms or notices. Resolve any active alarms before continuing. See "Troubleshooting" on page 101.

   If the ⚠ indicator is on, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

10. Verify that the ⏦ indicator illuminates solid, indicating that the UPS is operating normally and any loads are powered.

The UPS should be in Normal mode.

11. Press the ESC button until the start screen appears.

12. If optional EBMs are installed, see "Configuring the UPS for EBMs" on page 51 to set the number of installed EBMs.

13. To change any other factory-set defaults, see "Operation" on page 37.

NOTE *Eaton recommends setting the date and time.*

NOTE *At initial startup, the UPS sets system frequency according to input line frequency (input frequency auto-sensing is enabled by default). After initial startup, auto-sensing is disabled until manually re-enabled by output frequency setting.*

NOTE *At initial startup, input voltage auto-sensing is disabled by default. When manually enabled by output voltage setting, at the next AC startup the UPS sets output voltage according to input line voltage. After the subsequent startup, auto-sensing is disabled until manually re-enabled by output voltage setting.*

14. If you installed an optional REPO, test the REPO function:

Activate the external REPO switch. Verify the status change on the UPS display.

Deactivate the external REPO switch and restart the UPS.

NOTE *The internal batteries charge to 90% capacity in less than 3 hours. However, Eaton recommends that the batteries charge for 48 hours after installation or long-term storage. If optional EBMs are installed, see the recharge times listed in Table 25 on page 90.*

15. Keep your UPS firmware updated. See "Updating the UPS Firmware" on page 73.

Chapter 4 Operation

This chapter contains information on how to use the Eaton 9130, including front panel operation, operating modes, UPS startup and shutdown, transferring the UPS between modes, retrieving the Event Log, setting the power strategy, and configuring bypass settings, load segments, and battery settings.

Control Panel Functions

The UPS has a four-button graphical LCD with backlight. It provides useful information about the UPS itself, load status, events, measurements, and settings (see Figure 17).

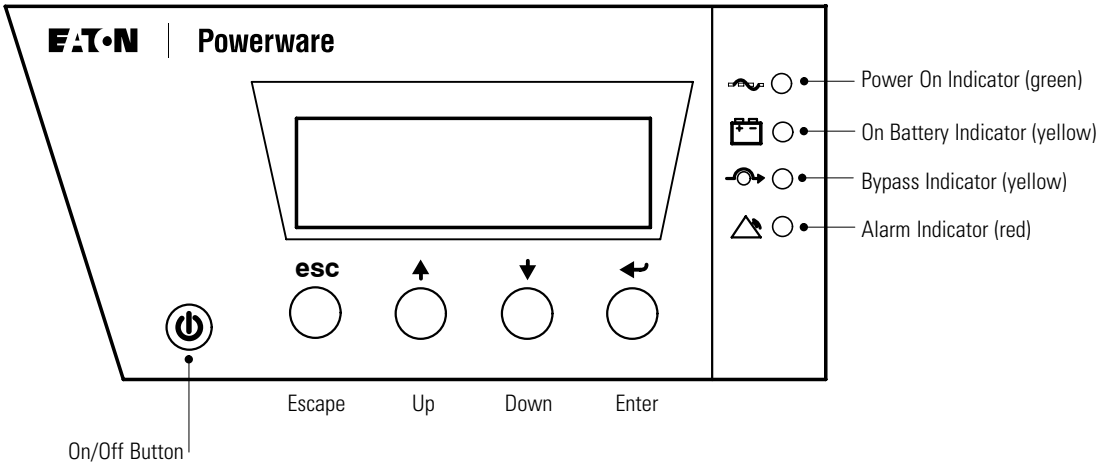


Figure 17. Eaton 9130 Control Panel

NOTE *The ⏻ button controls only the UPS output. The ⏻ button has no effect on equipment connected to the UPS.*

Table 1 shows the indicator status and description.

Table 1. Indicator Descriptions

Indicator	Status	Description
 Green	On	The UPS is operating normally.
	Flashing	A new information message is active.
 Yellow	On	The UPS is in Battery mode.
	Flashing	The battery voltage is below the warning level.
 Yellow	On	The UPS is in Bypass mode. The UPS is operating normally on bypass during High Efficiency operation.
 Red	On	The UPS has an active alarm or fault. See "Troubleshooting" on page 101 for additional information.

Changing the Language

Press and hold the first button on the left for approximately three seconds to select the language menu. This action is possible from any LCD menu screen.

Display Functions

As the default or after 15 minutes of inactivity, the LCD displays the start screen.

The backlit LCD automatically dims after 15 minutes of inactivity. Press any button to restore the screen.

Press any button to activate the menu options. Use the two middle buttons (↑ and ↓) to scroll through the menu structure. Press the Enter (↵) button to select an option. Press the ESC button to cancel or return to the previous menu.

Table 2 shows the basic menu structure.

Table 2. Menu Map for Display Functions

Main Menu	Submenu	Display Information or Menu Function
UPS Status		Main status (mode and load) / Notice or Alarm status (if any) / Battery status (state and charge level)
Event Log		Displays up to 127 events and alarms The Event Log is also available through the serial port. See "Retrieving the Event Log" on page 47.
Measurements		Load W VA / Load A pf / Output V Hz / Input V Hz / Bypass V Hz / Input Line Events / Battery V min
Control	Go to Bypass	Transfers the UPS system to internal Bypass mode When this command is active, the option changes to "Go to Normal."
	Start Battery Test	Starts a manual battery test See "Testing New Batteries" on page 72.
	Reset Error State	Clears a "Battery Test Failed" alarm
	Load Segments	Load segment 1: ON | OFF Load segment 2: ON | OFF These commands overrule user settings for load segments. See "Configuring Load Segments" on page 49.
	Restore Factory Settings	Returns all settings to original values
Identification		UPS Type / Part Number / Serial Number / Firmware
Settings	User Settings	See Table 3 for details.
	Service Settings	This menu is password-protected.

User Settings

The following table displays the options that can be changed by the user.

Table 3. User Settings

Description	Available Settings	Default Setting
Change Language	[English] [French] [Spanish] [German] [Russian] Menus, status, notices, and alarms are in all supported languages. UPS faults, Event Log data, and settings are in English only.	English
User Password	[Enabled] [Disabled] If Enabled is selected, the password is USER.	Disabled
Audible Alarms	[Enabled] [Disabled]	Enabled
Set Date and Time NOTE Time is a 24-hour clock.	Set Year, Month, Day, Hours, Minutes Date: yyyy/mm/dd Time: hh:mm	 2008/01/01 12:00
Signal Inputs	Setup: [Not Used] [Force Bypass] [Remote Shutdown] [Delayed Shutdown] [On Generator] [Building Alarm 1] Active: [High] [Low] See “Programmable Signal Inputs” on page 59.	RS232-3: Not Used, High cXSlot Serial: Delayed Shutdown, High cXSlot Signal: Remote Shutdown, Low
Relay Configuration	[UPS ok] [On Bypass] [On Battery] [Battery Low] [Ext. Charger On] See “Relay Output Contacts” on page 58.	Standard: UPS ok RS232-1: Battery Low RS232-8: On Battery cXSlot-K1: On Battery cXSlot-K2: Battery Low cXSlot-K3: UPS ok cXSlot-K4: On Bypass
Serial Port Configuration	[1200 bps] [2400 bps] [9600 bps] NOTE USB communication requires 9600 bps.	RS232: 9600 bps cXSlot: 9600 bps
Control Commands from Serial Port	[Enabled] [Disabled]	RS232: Enabled cXSlot: Enabled
Output Voltage	[100V] [110V] [120V] [127V] [Autosensing] [200V] [208V] [220V] [230V] [240V] [Autosensing]	120V (low voltage models) 230V (high voltage models)
Output Frequency	[50Hz] [60Hz] [Autosensing]	Autosensing

* See “Configuring Bypass Settings” on page 48.

Table 3. User Settings (continued)

Description	Available Settings	Default Setting
Frequency Converter	[Enabled] [Disabled] If Enabled, the UPS operates as a frequency converter, with bypass operation and all bypass-related alarms disabled.	Disabled
Overload Alarm Level	[10%] [20%] [30%] ... [100%] These values affect alarm level only, not UPS operation such as transfers or shutdown.	100% Generates the Output Overload alarm at the set level.
Transfer to Bypass When Overload*	[Immediate] [After Delay] If Immediate, transfer occurs at load >102%. If After Delay, transfer occurs according to Table 19 on page 84.	Immediate
Power Strategy	[Normal] [High Efficiency] See "Setting Power Strategy" on page 48.	Normal
Automatic Start Delay	[Disabled] [No Delay] [1s] [2s]...[32767s] If Disabled, automatic restart is not allowed. See "Configuring Load Segments" on page 49.	Load Segment 1: No Delay Load Segment 2: No Delay
Automatic on Battery Shutdown	[Disabled] [No Delay] [1s] [2s]...[32767s] Shutdown cancels if utility returns before the delay expires. See "Configuring Load Segments" on page 49.	Load Segment 1: Disabled Load Segment 2: Disabled
Start on Battery NOTE Utility must be present and output enabled at initial UPS startup.	[Enabled] [Disabled] After initial startup, battery voltage must exceed 2.10 volts per cell to start on battery.	Enabled
Energy Saving Mode	[Disabled] [50W] [100W] ... [1000W] UPS output is turned off if the UPS is on battery and output power is below the selected level.	Disabled
Remote Shutdown Delay	[No Delay] [1s] [2s]...[10800s]	No Delay
Delayed Shutdown Delay	[No Delay] [1s] [2s]...[10800s]	120s
Behavior on Rectifier Input Loss NOTE Available only in >3000 VA UPSs with separate supply sources for the rectifier and bypass inputs.	[Prefer Battery] [Prefer Bypass] If Prefer Bypass, upon loss the UPS will transfer to bypass in 3 seconds and remain as long as bypass is available.	Prefer Battery
On Battery Notice Delay	[0] [1s] [2s]...[99s]	5s

* See "Configuring Bypass Settings" on page 48.

Table 3. User Settings (continued)

Description	Available Settings	Default Setting
Site Wiring Fault Alarm	[Enabled] [Disabled] An active site wiring fault alarm prevents startup or, if operating, forces operation to Battery mode and disables bypass.	Enabled
Bypass Voltage Low Limit*	[-4%] [-5%] ... [-20%] of nominal	-15% of nominal
Bypass Voltage High Limit*	[+4%] [+5%] ... [+20%] of nominal	+10% of nominal
Qualify Bypass*	[Never] [When in Spec] [Always on UPS Fault] [Always]	When in Spec
Synchronization Window*	[Sync Disabled] [±0.5 Hz] [±1.0 Hz] [±2.0 Hz] [±3.0 Hz]	±2.0 Hz
Unsynchronized Transfers*	[Enabled] [Disabled]	Enabled
Number of Battery Strings	[0] [1] [2] ... [10] See “Configuring the UPS for EBMs” on page 51.	1
Battery Charge Mode	[ABM Cycling] [Constant]	ABM Cycling
Temperature Compensated Charging	[Enabled] [Disabled] If Disabled, the default charger voltages for 25°C (77°F) are assumed.	Enabled
Battery Charge % to Restart	[Not Checked] [10] [20] ... [100] If a percentage is selected, automatic restart (if enabled) occurs when the battery's charge reaches the selected level.	Not Checked
Battery Low Alarm	[Immediate] [2 min] [3 min] [5 min] The “Battery Low” alarm triggers when the set amount of backup time (approximately) remains in the batteries. If set to Immediate, the alarm activates at the same time as the “UPS on Battery” notice.	3 min
Automatic Battery Support Tests	[Enabled] [Disabled] See “Running Automatic Battery Tests” on page 52.	Enabled
Ambient Temperature Warning	[Enabled] [Disabled]	Enabled

* See “Configuring Bypass Settings” on page 48.

Table 3. User Settings (continued)

Description	Available Settings	Default Setting
Predictive Maintenance Notices	[Enabled] [Disabled]	Enabled
Remote Emergency Power-off (REPO) Input Polarity	[Open] [Closed]	Open

* See "Configuring Bypass Settings" on page 48.

Operating Modes

The Eaton 9130 front panel indicates the UPS status through the UPS indicators (see Figure 17 on page 37).

Normal Mode

During Normal mode, the indicator illuminates solid and the UPS is powered from the utility. The UPS monitors and charges the batteries as needed and provides filtered power protection to your equipment.

The UPS may at times silently implement a High Alert mode, usually when incoming utility conditions are unfavorable. In High Alert mode, the UPS disables the battery support test to ensure maximum capacity from the batteries if needed. The UPS will remain in High Alert for 24 hours or until changed by a Power Strategy command before returning to its previous mode.

Optional High Efficiency and Energy Saving settings minimize heat contribution to the rack environment. See "User Settings" on page 40.

Battery Mode

When the UPS is operating during a power outage, the alarm beeps once every five seconds and the indicator illuminates solid.

When the utility power returns, the UPS transfers to Normal mode operation while the battery recharges.

If battery capacity becomes low while in Battery mode, the indicator flashes slowly and the audible alarm beeps once every second. If the "Battery Low" alarm is set, the indicator also illuminates solid. This warning is approximate, and the actual time to shutdown may vary significantly.

NOTE *Depending on the UPS load and the number of Extended Battery Modules (EBMs) connected, the "Battery Low" warning may occur before the batteries reach 25% capacity. See Table 23 on page 88 for estimated runtimes.*

When utility power is restored after the UPS shuts down, the UPS automatically restarts.

Bypass Mode

In the event of a UPS overload or internal failure, the UPS transfers your equipment to utility power. Battery mode is not available and your equipment is not protected; however, the utility power continues to be passively filtered by the UPS. The indicator illuminates.

The UPS remains in Bypass mode for at least 5 seconds (if the bypass source remains acceptable). If three transfers to Bypass occur within 10 minutes for any reason other than user command, the UPS locks in Bypass for 1 hour or until any control button is pressed.

The UPS transfers to Bypass mode when:

- The user activates Bypass mode through the front panel.
- The UPS detects an internal failure.
- The UPS has an overtemperature condition.
- The UPS has an overload condition listed in Table 19 on page 84.

NOTE *The UPS shuts down after a specified delay for overload conditions listed in Table 19 on page 84. The UPS remains on to alarm the fault.*

Standby Mode

When the UPS is turned off and remains plugged into a power outlet, the UPS is in Standby mode. The ⏻ indicator is off, indicating that power is not available to your equipment. The battery recharges when necessary, and the communication bay is powered.

If utility fails and output turns off due to drained batteries or UPS internal failure, the UPS alarms in Standby mode and powers the communication bay for 1 hour 30 minutes or until battery voltage drops below 1.75 volts per cell (whichever occurs first).

If utility fails while the UPS is in Standby mode, the logic power supply turns off in approximately 10 seconds.

If the UPS is waiting on commands and utility fails, unit and logic power turn off in approximately 30 seconds.

UPS Startup and Shutdown

To start up or shut down the UPS, see:

- "Starting the UPS" on page 45
- "Starting the UPS on Battery" on page 46
- "UPS Shutdown" on page 47

Starting the UPS

To start the UPS:

1. Verify that the UPS power cord is plugged in.
2. Switch on utility power where the UPS is connected.

   The UPS front panel display illuminates and shows a status of "UPS initializing...".
3. Verify that the UPS transfers to Standby mode ("UPS on standby").
4. Press the ⏻ button on the UPS front panel for at least one second.

   The UPS front panel display changes status to "UPS starting...".

5. Check the UPS front panel display for active alarms or notices. Resolve any active alarms before continuing. See "Troubleshooting" on page 101.

   If the ⚠ indicator is on, do not proceed until all alarms are clear. Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

6. Verify that the ⏦ indicator illuminates solid, indicating that the UPS is operating normally and any loads are powered.

   The UPS should be in Normal mode.

7. Press the ESC button until the start screen appears.

Starting the UPS on Battery

NOTE *Before using this feature, the UPS must have been powered by utility power with output enabled at least once.*

NOTE *Battery start can be disabled. See the "Start on Battery" setting in "User Settings" on page 40.*

To start the UPS on battery:

1. Press the ⏻ button on the UPS front panel until the UPS front panel display illuminates and shows a status of "UPS starting...".

   The UPS cycles through Standby mode to Battery mode. The 🔋 indicator illuminates solid. The UPS supplies power to your equipment.

2. Check the UPS front panel display for active alarms or notices besides the "UPS on Battery" notice and notices that indicate missing utility power. Resolve any active alarms before continuing. See "Troubleshooting" on page 101.

   Check the UPS status from the front panel to view the active alarms. Correct the alarms and restart if necessary.

3. Press the ESC button until the start screen appears.

UPS Shutdown

To shut down the UPS:

1. Press the ⏻ button on the front panel for three seconds.

   The UPS starts to beep and shows a status of "UPS off pending...". The UPS then transfers to Standby mode, and the indicator turns off.

NOTE *Releasing the ⏻ button before three seconds returns the UPS to its original operating mode.*

2. Switch off utility power where the UPS is connected.

Transferring the UPS Between Modes

From Normal to Bypass Mode. Press any button to activate the menu options, then select CONTROL and GO TO BYPASS.

From Bypass to Normal Mode. Press any button to activate the menu options, then select CONTROL and GO TO NORMAL.

Retrieving the Event Log

To retrieve the Event Log through the display:

1. Press any button to activate the menu options, then select EVENT LOG.

2. Scroll through the listed events.

To retrieve the Event Log through the serial port:

1. From the communication device connected to the serial port, send one of the following command sequences: ESC-L (ASCII characters 27 and 76) or ESC-l (ASCII characters 27 and 108).

   The UPS returns a header containing the UPS identification (UPS type, part number, and serial number), firmware version, and the current date and time, followed by the event history.

2. Use the connected communication device to view or print the information. The report is delivered in ASCII format.

Setting Power Strategy

On the High Efficiency setting, the UPS operates normally on Bypass, transfers to inverter in less than 10 ms when utility fails, and transfers back to Bypass in 1 minute after utility returns. The indicator illuminates when the UPS transfers to Bypass.

NOTE *High Efficiency operation is available after one minute of stable power.*

To set the power strategy:

1. Press any button to activate the menu options, then select SETTINGS, USER SETTINGS, and POWER STRATEGY.
2. Select HIGH EFFICIENCY or NORMAL, and ENTER to confirm.

Configuring Bypass Settings

The following settings are available for configuring Bypass operation.

Transfer to Bypass When Overload. The default forces a transfer to Bypass when any overload condition occurs. You can configure the setting for a delayed transfer, with the amount of delay determined by the amount of overload, as shown in Table 19 on page 84.

Bypass Voltage Low Limit. The default disables a transfer to Bypass if the measured bypass voltage level is below the nominal output voltage minus 15%. You can configure the setting for another percentage of nominal. This setting can be overruled by the "Qualify Bypass" setting.

Bypass Voltage High Limit. The default disables a transfer to Bypass if the measured bypass voltage level is above the nominal output voltage plus 10%. You can configure the setting for another percentage of nominal. This setting can be overruled by the "Qualify Bypass" setting.

Qualify Bypass. The default allows a transfer to Bypass only when Bypass is within the following specifications:

- Bypass voltage is between the "Bypass Voltage Low Limit" and "Bypass Voltage High Limit" settings.
- Bypass frequency is within nominal frequency ±5 Hz.
- The inverter is synchronized with Bypass when the "Unsynchronized Transfers" setting is disabled.

You can prohibit Bypass ("Never") or always allow Bypass with no specification checking ("Always"). For "Always on UPS Fault," transfer to Bypass is always made on UPS fault; otherwise, operation proceeds as with the default setting.

Synchronization Window. The UPS tries to synchronize with Bypass when the Bypass frequency is less than the value set for the "Synchronization Window" setting. When the Bypass frequency is more than the set value, the UPS goes to nominal frequency. On Bypass the synchronization window is ±5 Hz. If synchronization is disabled ("Sync Disabled"), the UPS will synchronize only when operating on Bypass.

Unsynchronized Transfers. The default allows an unsynchronized transfer to Bypass. You can configure the setting to not allow such transfers. This setting can be overruled by the "Qualify Bypass" setting.

Configuring Load Segments

Load segments are sets of receptacles that can be controlled by power management software or through the display, providing an orderly shutdown and startup of your equipment. For example, during a power outage, you can keep key pieces of equipment running while you turn off other equipment. This feature allows you to save battery power.

Each UPS has two configurable load segments:

- Load Segment 1: Upper outlets and higher rated outlets if available.
- Load Segment 2: Lower outlets

See "Rear Panels" on page 91 for load segments for each UPS model.

To control the load segments with power management software, see your power management software manual for details (refer to the Software Suite CD or www.powerware.com for the latest information).

To control the load segments through the display:

1. Press any button to activate the menu options, then select CONTROL and LOAD SEGMENTS.
2. Set the desired load segment ON or OFF, and ENTER to confirm.
3. Set the other load segment if applicable.

To set the restart and shutdown delay times for each load segment:

1. Press any button to activate the menu options, then select SETTINGS, USER SETTINGS and AUTOMATIC START DELAY.
2. Set the restart delay for one load segment, and ENTER to confirm.
3. Set the other load segment if applicable.
4. Select AUTOMATIC ON BATTERY SHUTDOWN.
5. Set the shutdown delay for one load segment, and ENTER to confirm.
6. Set the other load segment if applicable.

NOTE *Load segment On/Off commands issued through the Control menu overrule the user settings for load segments.*

Configuring Battery Settings

Set the UPS for the number of EBMs installed, whether to run automatic battery tests, and automatic restart configuration.

Configuring the UPS for EBMs

To ensure maximum battery runtime, configure the UPS for the correct number of EBMs:

1. Press any button on the front panel display to activate the menu options, then select SETTINGS, USER SETTINGS, and NUMBER OF BATTERY STRINGS.
2. Use the ↑ or ↓ buttons to select the number of battery strings according to your UPS configuration:

All UPS and EBM Cabinets	Number of Battery Strings
UPS only (internal batteries)	1 (default)
UPS + 1 EBM	3
UPS + 2 EBMs	5
UPS + 3 EBMs	7
UPS + 4 EBMs	9

NOTE If 0 is selected, no batteries are connected and all battery-related alarms are disabled.
NOTE The UPS contains one battery string; each EBM contains two battery strings.

3. Press the ↵ button to save the setting.
4. Press the ESC button until the start screen appears.

Running Automatic Battery Tests

Automatic battery tests run approximately every 30 days, unless disabled. During the test, the UPS transfers to Battery mode and discharges the batteries for 25 seconds under the existing load.

NOTE *The "UPS on Battery" notice and the "Battery Low" alarm do not activate during a battery test.*

For automatic battery tests to run:

- The "Automatic Battery Support Tests" setting must be enabled.
- The UPS must be in Normal mode, with no active alarms.
- The batteries must be fully charged.
- The bypass voltage must be acceptable.
- No manual battery test was initiated previously in the same charging cycle.

To pass the battery test, the battery voltage must remain above the threshold value during discharge.

Configuring Automatic Restart

The UPS automatically restarts if utility returns after the output was shut off due to exhausted batteries, a shutdown input signal, or automatic shutdown command.

You can set the load segment for the amount of time to delay the restart once utility returns, using the "Automatic Start Delay" setting. You can also configure UPS restart to depend on the battery charge level, using the "Battery Charge % to Restart" setting.

Chapter 5 Communication

This section describes the:

- Communication ports (RS-232 and USB)
- Connectivity cards
- Remote Emergency Power-off (REPO)
- Relay output contacts
- Programmable signal inputs
- Modem operation
- Powerware LanSafe® Power Management Software

Figure 18 shows the location of the communication options and control terminals on a typical UPS.

See "Rear Panels" on page 91 for rear panel diagrams for each model.

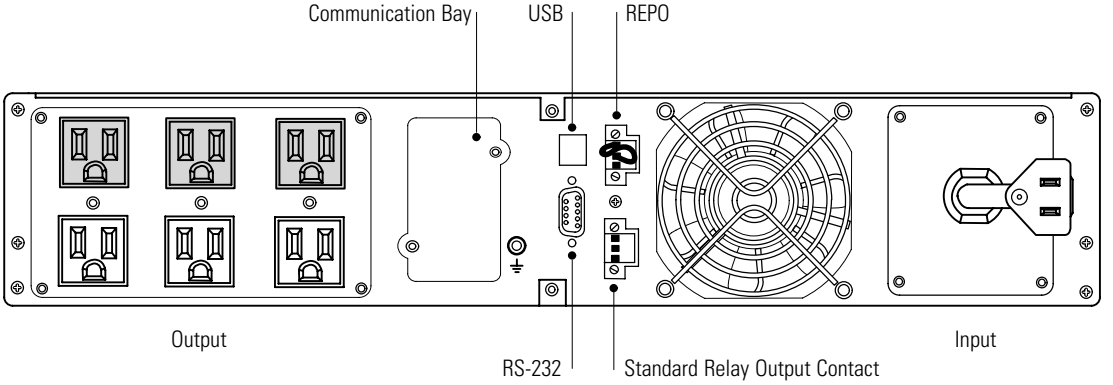


Figure 18. Communication Options and Control Terminals (PW9130L1000R-XL2U Model Shown)

Installing Communication Options and Control Terminals

To install the communication options and control terminals:

1. Install the appropriate connectivity card and/or necessary cable(s) and connect the cables to the appropriate location.

   See Figure 18 and the following section, "Communication Options," for detailed information.

2. Route and tie the cable(s) out of the way.

3. Continue to "Operation" on page 37 to start up the UPS.

Communication Options

The Eaton 9130 has serial communication capabilities through the USB and RS-232 communication ports or through a connectivity card in the available communication bay.

The UPS supports two serial communication devices according to the following table:

Independent	Multiplexed	
Communication Bay	**USB**	**RS-232**
Any connectivity card	Available	Not in use
Any connectivity card	Not in use	Available

NOTE *You can configure relays, signal inputs, and the serial port baud rate through the front panel menus (see Table 3 on page 40).*

NOTE *The communication speed of the USB port is fixed at 9600 bps.*

RS-232 and USB Communication Ports

To establish communication between the UPS and a computer, connect your computer to one of the UPS communication ports using an appropriate communication cable (not supplied). See Figure 18 for the communication port locations.

When the communication cable is installed, power management software can exchange data with the UPS. The software polls the UPS for detailed information on the status of the power environment. If a power emergency occurs, the software initiates the saving of all data and an orderly shutdown of the equipment.

The cable pins for the RS-232 communication port are identified in Figure 19, and the pin functions are described in Table 4.

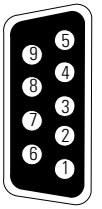


Figure 19. RS-232 Communication Port (DB-9 Connector)

Table 4. RS-232 Communication Port Pin Assignment

Pin Number	Signal Name	Function	Direction from the UPS
1	DCD	Battery Low signal[1,3]	Out
2	RxD	Transmit to external device	Out
3	TxD	Receive from external device[2]	In
4	DTR	PnP from external device (tied to Pin 6)	In
5	GND	Signal common (tied to chassis)	—
6	DSR	To external device (tied to Pin 4)	Out
7	RTS	No connection	In
8	CTS	On Battery signal[1,3]	Out
9	RI	+8-12 Vdc power	Out

[1] Configurable; see the "Relay Configuration" setting in "User Settings" on page 40.

[2] If Pin 3 receives a Low (+V) signal for ≥5 seconds, the UPS executes the command selected by the "Signal Inputs" setting in "User Settings" on page 40.

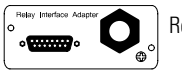
[3] When the selected condition is active, output signals on Pins 1 and 8 shift from Low (positive voltage) to High (negative voltage). When the condition no longer exists, the output signal returns to Low.

Connectivity Cards

Connectivity cards allow the UPS to communicate in a variety of networking environments and with different types of devices. The Eaton 9130 has one available communication bay for the following connectivity cards:

- **ConnectUPS™-BD Web/SNMP Card** - has SNMP and HTTP capabilities as well as monitoring through a Web browser interface; connects to a twisted-pair Ethernet (10/100BaseT) network. In addition, a Powerware Environmental Monitoring Probe can be attached to obtain humidity, temperature, smoke alarm, and security information.
- **Relay Interface Card** - has isolated dry contact (Form-C) relay outputs for UPS status: Utility failure, Low battery, UPS alarm/OK, or On bypass.

See Figure 18 on page 53 for the location of the communication bay.

ConnectUPS-BD Web/SNMP Card  

Relay Interface Card

Figure 20. Optional Connectivity Cards

Remote Emergency Power-off

REPO is used to shut down the UPS from a distance. This feature can be used for shutting down the load and the UPS by thermal relay, for instance in the event of room overtemperature. When REPO is activated, the UPS shuts down the output and all its power converters immediately. The UPS remains on to alarm the fault.

WARNING

The REPO circuit is an IEC 60950 safety extra low voltage (SELV) circuit. This circuit must be separated from any hazardous voltage circuits by reinforced insulation.

CAUTION

- The REPO must not be connected to any utility connected circuits. Reinforced insulation to the utility is required. The REPO switch must have a minimum rating of 24 Vdc and 20 mA and be a dedicated latching-type switch not tied into any other circuit. The REPO signal must remain active for at least 250 ms for proper operation.
- To ensure the UPS stops supplying power to the load during any mode of operation, the input power must be disconnected from the UPS when the emergency power-off function is activated.

NOTE *For Europe, the emergency switch requirements are detailed in Harmonized document HD-384-48 S1, "Electrical Installation of the Buildings, Part 4: Protection for Safety, Chapter 46: Isolation and Switching."*

REPO Connections			
Wire Function		**Terminal Wire Size Rating**	**Suggested Wire Size**
REPO	L1 L2	4–0.32 mm^2 (12–22 AWG)	0.82 mm^2 (18 AWG)

NOTE *Leave the REPO connector installed in the REPO port on the UPS even if the REPO function is not needed.*

See Figure 18 on page 53 for REPO location. Figure 21 shows a schematic of the REPO connector contacts.

Figure 21. REPO Connections

You can set the REPO polarity. See the "REPO Input Polarity" setting in "User Settings" on page 40.

NOTE *Depending on user configuration, the pins must be shorted or open to keep the UPS running. To restart the UPS, reconnect (re-open) the REPO connector pins and turn on the UPS manually. Maximum resistance in the shorted loop is 10 ohm.*

NOTE *The following models have the REPO port configured for "Force to Bypass" function: rack models PW9130G1000R-XL2UAU, PW9130G1500R-XL2UAU, PW9130G2000R-XL2UAU, PW9130G3000R-XL2UAU and tower models PW9130G700T-XLAU, PW9130G1000T-XLAU, PW9130G1500T-XLAU, PW9130G2000T-XLAU, PW9130G3000T-XLAU. In the "Force to Bypass" state, the UPS transfers to Bypass model in every condition except frequency converter and generator mode.*

NOTE *Always test the REPO function before applying your critical load to avoid accidental load loss.*

Relay Output Contacts

The UPS incorporates three programmable relay outputs with potential free contacts for remote alarm indications: a standard relay port and two outputs in the RS-232 communication port. See Figure 18 on page 53 for the locations of the ports. An additional four relay outputs can be obtained with the compatible Relay Interface Card.

Configure the relay outputs with the "Relay Configuration" setting in "User Settings" on page 40.

WARNING

The relay output contacts must not be connected to any utility connected circuits. Reinforced insulation to the utility is required. The relay output contacts have a maximum rating of 30 Vac/1A and 60 Vdc/2A nominal values.

Table 5 shows the options for the relay output contacts.

Table 5. Relay Output Configuration Options

Signal	Description
UPS ok	Activated when the UPS is feeding the load on inverter or on bypass and no alarms are active
On Bypass	Activated when the UPS is NOT on bypass operation
On Battery	Activated when the UPS operates on battery and the "On Battery Notice Delay" time has expired
Battery Low	Activated with the "Battery Low" alarm according to the "Battery Low Alarm" setting
Ext. Charger On	Controls an optional external battery charger on and off

Figure 22 shows a schematic of the relay output contacts.

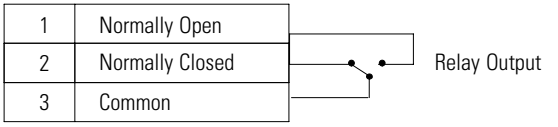


Figure 22. Standard Relay Port Connections

Programmable Signal Inputs

The UPS incorporates four programmable signal inputs: one RS-232 input, two connectivity card inputs, and one REPO terminal input. See Figure 18 on page 53 for the locations of the ports. Configure the inputs with the "Signal Inputs" setting in "User Settings" on page 40.

Table 6 shows the programmable settings for the signal inputs. Table 7 shows the operation logic for the signal inputs.

Table 6. Programmable Signal Inputs

Signal	Description
Not Used	The input operates only as a serial input (RxD) or has no function.
Force Bypass	If active, the UPS is forced to static bypass operation regardless of the bypass status.
Remote Shutdown	If active, the UPS output turns off after a user-defined remote shutdown delay. The batteries continue charging. Inactive input does not abort the shutdown countdown and does not cause the UPS to start up automatically.
Delayed Shutdown (and restart)	If active, the UPS output turns off after a user-defined delayed shutdown delay. The batteries continue charging. Inactive input does not abort the shutdown countdown but will cause the UPS to start up automatically if the input voltage exists.
On Generator	If active, synchronization is disabled and the UPS transfers to bypass.
Building Alarm 1	If active, the UPS generates the "Building Alarm 1" alarm.

Table 7. Polarity Options

Input	Description
High	Active state on high voltage (+Udc) level
Low	Active state on low voltage (GND or -Udc) level

Modem Operation

To configure the UPS and modem handling features for remote monitoring and service, contact your service representative.

Powerware LanSafe Power Management Software

Each Eaton 9130 UPS ships with Powerware LanSafe Power Management Software. To begin installing Powerware LanSafe software, see the instructions accompanying the Software Suite CD.

NOTE *When installing Powerware LanSafe software, select serial port installation. For the UPS manufacturer and model, select* ***Powerware*** *and* ***Powerware 9130****. If the Powerware brand options are not available in your version of the software, select* ***Generic UPSs*** *for the manufacturer and* ***Generic XCP*** *for the model.*

Powerware LanSafe software provides up-to-date graphics of UPS power and system data and power flow. It also gives you a complete record of critical power events, and it notifies you of important UPS or power information. If there is a power outage and the Eaton 9130 UPS battery power becomes low, Powerware LanSafe software can automatically shut down your computer system to protect your data before the UPS shutdown occurs.

Chapter 6 UPS Maintenance

This section explains how to:

- Care for the UPS and batteries
- Replace the UPS internal batteries and Extended Battery Modules (EBMs)
- Test new batteries
- Recycle used batteries or UPS
- Update the UPS firmware

UPS and Battery Care

For the best preventive maintenance, keep the area around the UPS clean and dust-free. If the atmosphere is very dusty, clean the outside of the system with a vacuum cleaner.

For full battery life, keep the UPS at an ambient temperature of 25°C (77°F).

NOTE *If the UPS requires any type of transportation, verify that the UPS is unplugged and turned off and then disconnect the UPS internal battery connector (see Figure 24 on page 64 for rackmount models or Figure 26 on page 67 for tower models).*

NOTE *The batteries in the UPS are rated for a 3–5 year service life. The length of service life varies, depending on the frequency of usage and ambient temperature. Batteries used beyond expected service life will often have severely reduced runtimes. Replace batteries at least every 5 years to keep units running at peak efficiency.*

Storing the UPS and Batteries

If you store the UPS for a long period, recharge the battery every 6 months by connecting the UPS to utility power. The internal batteries charge to 90% capacity in less than 3 hours. However, Eaton recommends that the batteries charge for 48 hours after long-term storage. If optional EBMs are installed, see the recharge times listed in Table 25 on page 90.

Check the battery recharge date on the shipping carton label. If the date has passed and the batteries were never recharged, do not use the UPS. Contact your service representative.

When to Replace Batteries

When the ⚠ indicator illuminates, the audible alarm beeps, and the "Battery Needs Service" alarm displays, the batteries may need replacing. Contact your service representative to order new batteries.

Replacing Batteries

NOTE *DO NOT DISCONNECT the batteries while the UPS is in Battery mode.*

Batteries can be replaced easily without turning the UPS off or disconnecting the load.

If you prefer to remove input power to change the batteries, see "UPS Shutdown" on page 47.

Consider all warnings, cautions, and notes before replacing batteries.

WARNING

- Servicing should be performed by qualified service personnel knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.
- Batteries can present a risk of electrical shock or burn from high short circuit current. Observe the following precautions: 1) Remove watches, rings, or other metal objects; 2) Use tools with insulated handles; 3) Do not lay tools or metal parts on top of batteries, 4) Wear rubber gloves and boots.
- When replacing batteries, replace with the same type and number of batteries or battery packs. Contact your service representative to order new batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Never dispose of batteries in a fire. Batteries may explode when exposed to flame.

- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes and may be extremely toxic.
- Determine if the battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).
- ELECTRIC ENERGY HAZARD. Do not attempt to alter any battery wiring or connectors. Attempting to alter wiring can cause injury.
- Disconnect charging source prior to connecting or disconnecting battery terminals.

Replacing Rackmount UPS Internal Batteries

CAUTION

The UPS internal batteries are heavy (see page 78). Use caution when handling the heavy batteries.

The internal batteries are located behind the UPS right front cover (behind the LCD control panel). The internal batteries are packaged together as one unit for easier handling.

To replace the batteries in the UPS:

1. Remove the UPS right front cover (see Figure 23).

To remove the cover, remove and retain the two screws on the right side of the cover. Grasp the top and bottom of the cover and slide the cover to the **right**.

NOTE *A ribbon cable connects the LCD control panel to the UPS. Do not pull on the cable or disconnect it.*

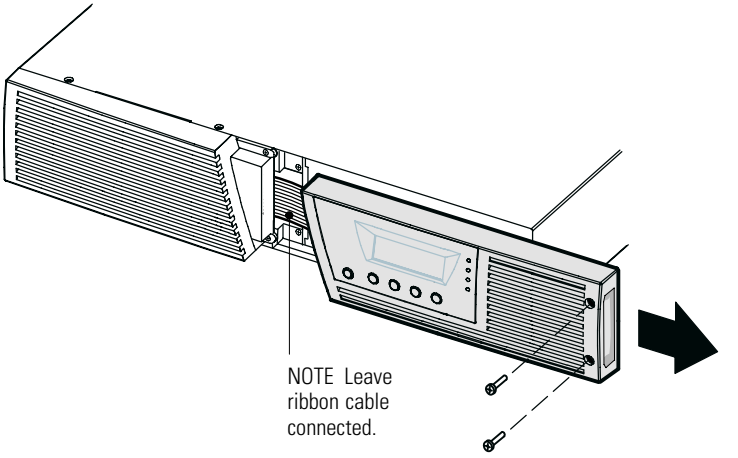


Figure 23. Removing the UPS Right Front Cover

2. Disconnect the internal battery connector (see Figure 24).

3. **Up to 1500 VA models only.** If the EBM cable is not connected to an EBM, unclip the EBM cable and move it to the left out of the way. See Figure 24.

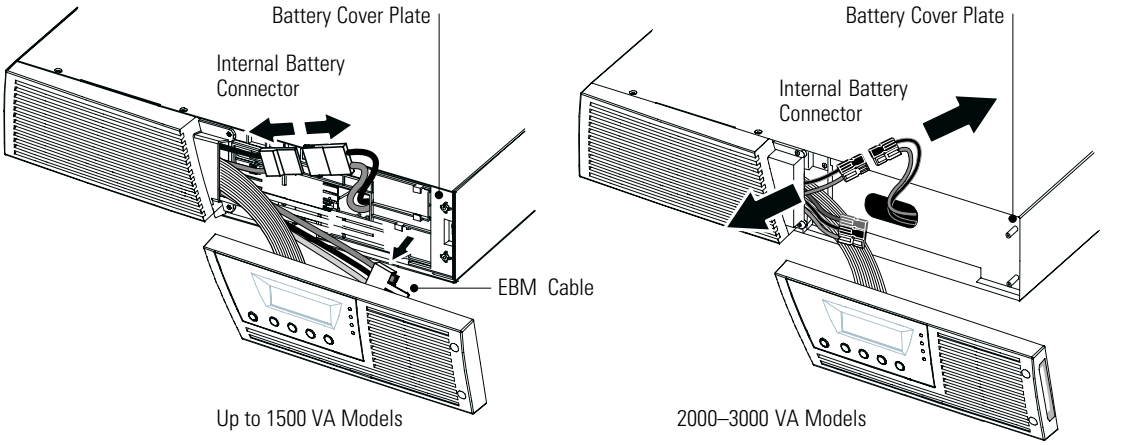


Figure 24. Disconnecting the UPS Internal Batteries (Shown without EBMs)

4. Grasp an edge of the battery cover plate and pull it forward gently. Remove and retain the battery cover plate. See Figure 24 for the location of the battery cover plate.

5. Carefully pull the handle on the battery tray and slide the battery package slowly out onto a flat, stable surface; use two hands to support the battery package. See "Recycling the Used Battery or UPS" on page 73 for proper disposal.

NOTE *Verify that the replacement batteries have the same rating as the batteries being replaced.*

6. Slide the new battery package into the cabinet. Push the battery package in firmly.

7. Replace the battery cover plate onto the screw mounts, threading the battery connector through the access slot.

CAUTION

A small amount of arcing may occur when connecting the internal batteries. This is normal and will not harm personnel. Connect the cables quickly and firmly.

8. Reconnect the internal battery connector. Connect red to red, and black to black. Press the two parts tightly together to ensure a proper connection.

9. **Up to 1500 VA models only.** If the EBM cable is not connected to an EBM, clip the EBM cable back into its holder on the battery cover plate. See Figure 24.

10. Replace the UPS right front cover.

    To replace the cover, verify that the ribbon cable is protected and (if EBMs are installed) the EBM cable is routed through the knockout on the bottom of the cover. Slide the cover to the left until it aligns with the left front cover. Reinstall the two screws on the right side of the right front cover.

11. Continue to "Testing New Batteries" on page 72.

Replacing Tower UPS Internal Batteries

CAUTION

The UPS internal batteries are heavy (see page 78). Use caution when handling the heavy batteries.

The internal batteries are located behind the UPS front cover. The internal batteries are packaged together as one unit for easier handling.

To replace the batteries in the UPS:

1. Remove the UPS front cover (see Figure 25).

To remove the cover, push down on the top of the cover and pull the cover toward you to unclip it from the cabinet.

NOTE *A ribbon cable connects the LCD control panel to the UPS. Do not pull on the cable or disconnect it.*

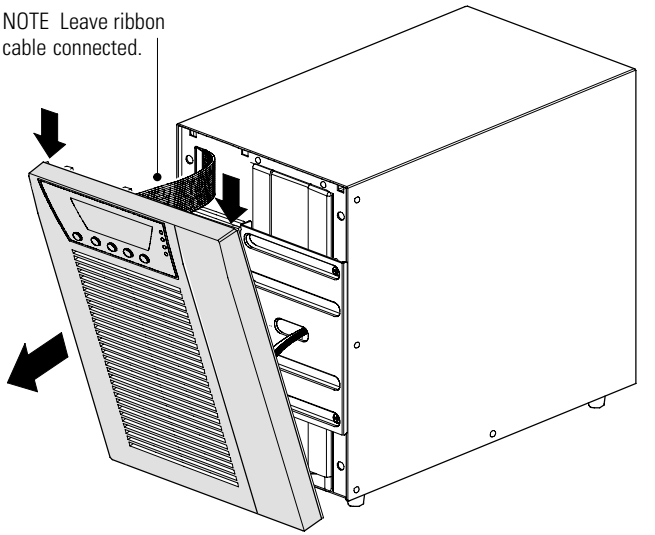


Figure 25. Removing the UPS Front Cover

2. Remove and retain the two screws holding the internal battery connector. Disconnect the internal battery connector. See Figure 26.

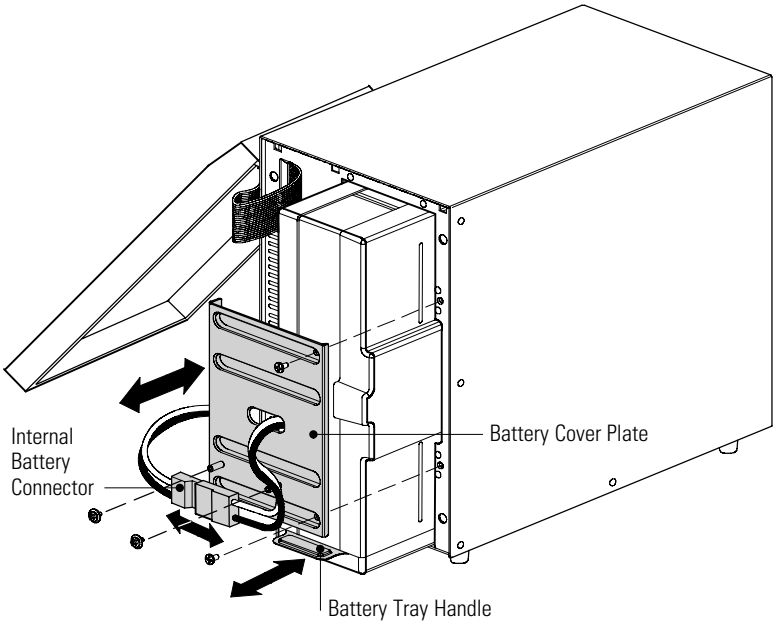


Figure 26. Replacing the UPS Internal Batteries

3. Remove and retain the two screws holding the battery cover plate. Grasp an edge of the battery cover plate and pull it forward gently. Remove and retain the battery cover plate.

4. Carefully pull the handle on the battery tray and slide the battery package slowly out onto a flat, stable surface; use two hands to support the battery package. See "Recycling the Used Battery or UPS" on page 73 for proper disposal.

NOTE *Verify that the replacement batteries have the same rating as the batteries being replaced.*

5. Slide the new battery package into the cabinet. Push the battery package in firmly.

6. Replace the battery cover plate into the slots at left, threading the battery connector through the access slot. Reinstall the retained screws.

CAUTION

A small amount of arcing may occur when connecting the internal batteries. This is normal and will not harm personnel. Connect the cables quickly and firmly.

7. Reconnect the internal battery connector. Connect red to red, and black to black. Press the two parts tightly together to ensure a proper connection.

8. Place the connector between the screw mounts and reinstall the retained screws.

9. Replace the UPS front cover.

   To replace the cover, verify that the ribbon cable is protected, then insert the clips on the back of the cover into the cabinet and push firmly to snap the cover into place.

10. Continue to "Testing New Batteries" on page 72.

Replacing Rackmount EBMs

CAUTION

The EBM is heavy (see page 78). Lifting the cabinet into the rack requires a minimum of two people.

To replace the EBMs:

1. Remove the front cover of each EBM. See Figure 27.

To remove the cover, remove and retain the two screws on the right side of the cover. Grasp the sides of the cover and slide the cover to the **left** and then away from the cabinet.

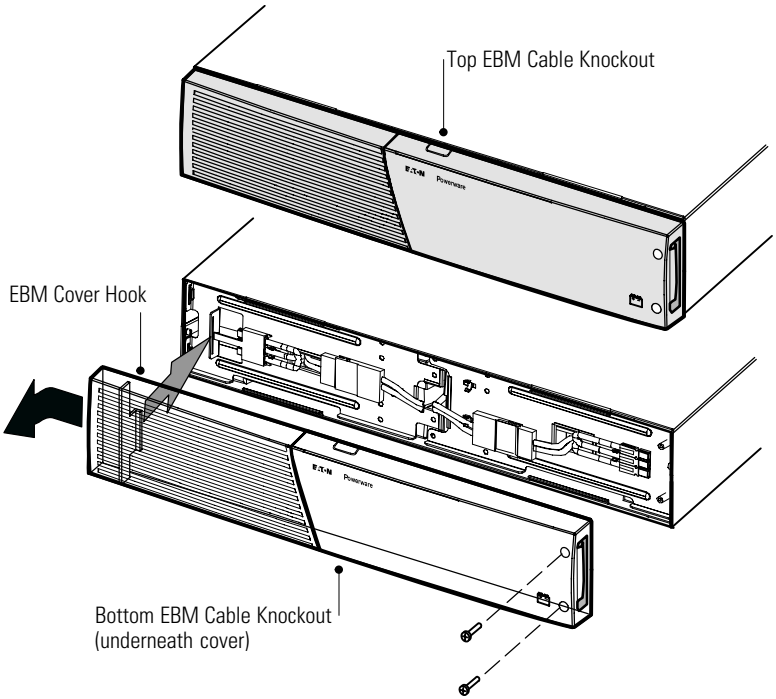


Figure 27. Removing the EBM Front Cover

2. Unplug the EBM cable from the UPS.

   If additional EBMs are installed, unplug the EBM cable from the battery connector on each EBM.

3. If not already installed, install the supplied mounting brackets on the new EBM(s).

4. Replace the EBM(s). See "Recycling the Used Battery or UPS" on page 73 for proper disposal.

5. Remove the front cover of each new EBM. See Figure 27.

   To remove the cover, remove and retain the two screws on the right side of the cover. Grasp the sides of the cover and slide the cover to the **left** and then away from the cabinet.

6. For the bottom (or only) EBM, remove the EBM cable knockout on the top of the cover. See Figure 27 for the location of the top EBM cable knockout.

7. If you are installing more than one new EBM, for each additional EBM remove the EBM cable knockout on the top **and** bottom of the EBM front cover. See Figure 27 for the location of the EBM cable knockouts.

8. Plug the new EBM(s) into the UPS. For reference, see Figure 13 on page 28.

   Up to 1500 VA models. Connect the EBM connector from the UPS to the EBM connector on the EBM. Press the two parts tightly together to ensure a proper connection.

   2000–3000 VA models. Connect the EBM connector from the UPS to the EBM connector on the EBM. Connect red to red, black to black, and green to green. Press the two parts tightly together to ensure a proper connection.

   All models. To connect a second EBM, unclip the EBM connector on the first EBM and pull gently to extend the wiring to the EBM connector on the second EBM. Repeat for any additional EBMs.

9. Verify that the EBM connections are tight and that adequate bend radius and strain relief exist for each cable.

10. Replace the EBM front cover.

To replace the cover, verify that the EBM cables are routed through the EBM cover knockouts, then slide the cover from the left to the right until it connects with the cover hook near the left side of the EBM cabinet. Reinstall the two screws on the right side of the front cover. For reference, see Figure 27 on page 69.

Repeat for each additional EBM.

11. Verify that all wiring connecting the UPS and EBM(s) is installed behind the front covers and is inaccessible to users.

Replacing Tower EBMs

CAUTION

The EBM is heavy (see page 78). Lifting the cabinet requires a minimum of two people.

To replace the EBMs:

1. Unplug the EBM cable from the UPS.

If additional EBMs are installed, unplug the EBM cable from the battery connector on each EBM.

2. Replace the EBM(s). See "Recycling the Used Battery or UPS" on page 73 for proper disposal.

3. For each replaced EBM, remove the cable retention clip covering the battery connector(s), as shown in Figure 16 on page 33. Retain the clips and screws.

CAUTION

A small amount of arcing may occur when connecting an EBM to the UPS. This is normal and will not harm personnel. Insert the EBM cable into the UPS battery connector quickly and firmly.

4. Plug the EBM cable(s) into the battery connector(s) as shown in Figure 16 on page 33. Up to four EBMs may be connected to the UPS.

5. For each cable retention clip removed, rotate the clip and install it under each EBM cable connection using the retained screws.

6. Verify that the EBM connections are tight and that adequate bend radius and strain relief exist for each cable.

Testing New Batteries

To test new batteries:

1. Plug the UPS into a power outlet for 48 hours to charge the batteries.

2. Press any button to activate the menu options.

3. Select CONTROL then START BATTERY TEST.

   The UPS starts a battery test if the batteries are fully charged, the UPS is in Normal mode with no active alarms, and the bypass voltage is acceptable.

   During the battery test, the UPS transfers to Battery mode and discharges the batteries for 25 seconds. The front panel displays "Battery test running" and the percentage of the test completed.

Recycling the Used Battery or UPS

Contact your local recycling or hazardous waste center for information on proper disposal of the used battery or UPS.

WARNING

- Do not dispose of the battery or batteries in a fire. Batteries may explode. Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.

CAUTION

Do not discard the UPS or the UPS batteries in the trash. This product contains sealed, lead-acid batteries and must be disposed of properly. For more information, contact your local recycling/reuse or hazardous waste center.

CAUTION

Do not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

Updating the UPS Firmware

To keep the UPS firmware updated with the latest improvements and benefits, visit www.powerware.com often for updates. You can download the latest firmware version and the instructions for installing it.

Chapter 7 Specifications

Model Specifications

This section provides the following specifications:

- Communication options
- Model lists
- Weights and dimensions
- Electrical input and output
- Environmental and safety
- Battery

Table 8. Communication Options (All Models)

Communication Bay	(1) available independent communication bay for connectivity cards
Compatible Connectivity Cards	ConnectUPS-BD Web/SNMP Card Relay Interface Card
Communication Ports	RS-232 (DB-9): 1200–9600 bps USB: 9600 bps
Signal Inputs	(4) programmable signal inputs (signal and signal return) for indicating building alarms or other use
Relay Output Contacts	(1) three-pole connector with (1) contact closure

Table 9. Extended Battery Module Model List

EBM Model	Configuration	Battery Voltage	For Power Ratings
PW9130N1000R-EBM2U	Rackmount	36 Vdc	700–1000 VA
PW9130N1500R-EBM2U		48 Vdc	1500 VA
PW9130N3000R-EBM2U		72 Vdc	2000–3000 VA
PW9130N1000T-EBM	Tower	36 Vdc	1000 VA
PW9130N1500T-EBM		48 Vdc	1500 VA
PW9130N3000T-EBM		96 Vdc	2000–3000 VA

Table 10. UPS Model List (Rackmount Models)

Model	Power Level	Rear Panel Diagram
PW9130L700R-XL2U	700 VA / 630W	Figure 28 on page 91
PW9130L1000R-XL2U	1000 VA / 900W	Figure 28 on page 91
PW9130L1500R-XL2U	1500 VA / 1350W	Figure 33 on page 92
PW9130L2000R-XL2U	2000 VA / 1800W	Figure 35 on page 93
PW9130L2500R-XL2U	2500 VA / 2250W	Figure 39 on page 94
PW9130L3000R-XL2U	3000 VA / 2700W	Figure 39 on page 94
PW9130G1000R-XL2U	1000 VA / 900W	Figure 29 on page 91
PW9130G2000R-XL2U	2000 VA / 1800W	Figure 36 on page 93
PW9130G2500R-XL2U	2500 VA / 2250W	Figure 40 on page 94
PW9130G3000R-XL2U	3000 VA / 2700W	Figure 40 on page 94
PW9130i1000R-XL2U	1000 VA / 900W	Figure 30 on page 91
PW9130i1500R-XL2U	1500 VA / 1350W	Figure 34 on page 92
PW9130i2000R-XL2U	2000 VA / 1800W	Figure 37 on page 93
PW9130i3000R-XL2U	3000 VA / 2700W	Figure 41 on page 94
PW9130G1000R-XL2UEU	1000 VA / 900W	Figure 30 on page 91
PW9130G2000R-XL2UEU	2000 VA / 1800W	Figure 37 on page 93
PW9130G2500R-XL2UEU	2500 VA / 2250W	Figure 41 on page 94
PW9130G3000R-XL2UEU	3000 VA / 2700W	Figure 41 on page 94
PW9130G1000R-XL2UAU	1000 VA / 900W	Figure 31 on page 92
PW9130G1500R-XL2UAU	1500 VA / 1350W	Figure 32 on page 92
PW9130G2000R-XL2UAU	2000 VA / 1800W	Figure 38 on page 93
PW9130G3000R-XL2UAU	3000 VA / 2700W	Figure 42 on page 94

Table 11. UPS Model List (Tower Models)

Model	Power Level	Rear Panel Diagram
PW9130L700T-XL	700 VA / 630W	Figure 43 on page 95
PW9130L1000T-XL	1000 VA / 900W	Figure 44 on page 95
PW9130L1500T-XL	1500 VA / 1350W	Figure 45 on page 95
PW9130L2000T-XL	2000 VA / 1800W	Figure 46 on page 95
PW9130L3000T-XL	3000 VA / 2700W	Figure 47 on page 96
PW9130G1000T-XL	1000 VA / 900W	Figure 48 on page 96
PW9130G2000T-XL	2000 VA / 1800W	Figure 49 on page 96
PW9130G3000T-XL	3000 VA / 2700W	Figure 50 on page 96
PW9130i700T-XL	700 VA / 630W	Figure 51 on page 97
PW9130i1000T-XL	1000 VA / 900W	Figure 52 on page 97
PW9130i1500T-XL	1500 VA / 1350W	Figure 53 on page 97
PW9130i2000T-XL	2000 VA / 1800W	Figure 54 on page 97
PW9130i3000T-XL	3000 VA / 2700W	Figure 55 on page 98
PW9130G1000T-XLEU	1000 VA / 900W	Figure 52 on page 97
PW9130G2000T-XLEU	2000 VA / 1800W	Figure 54 on page 97
PW9130G3000T-XLEU	3000 VA / 2700W	Figure 55 on page 98
PW9130G700T-XLAU	700 VA / 630W	Figure 56 on page 98
PW9130G1000T-XLAU	1000 VA / 900W	Figure 57 on page 98
PW9130G1500T-XLAU	1500 VA / 1350W	Figure 58 on page 98
PW9130G2000T-XLAU	2000 VA / 1800W	Figure 59 on page 99
PW9130G3000T-XLAU	3000 VA / 2700W	Figure 60 on page 99

Table 12. Weights and Dimensions (Rackmount Models)

Model (Rackmount UPS)	Dimensions (H × W × D)	Weight
PW9130L700R-XL2U PW9130L1000R-XL2U PW9130G1000R-XL2U PW9130i1000R-XL2U PW9130G1000R-XL2UEU PW9130G1000R-XL2UAU	86.5 × 438 × 430 mm (3.4″ × 17.2″ × 16.9″)	16.0 kg (35.3 lb)
PW9130L1500R-XL2U PW9130i1500R-XL2U PW9130G1500R-XL2UAU	86.5 × 438 × 430 mm (3.4″ × 17.2″ × 16.9″)	19.5 kg (43.0 lb)
PW9130L2000R-XL2U PW9130G2000R-XL2U PW9130i2000R-XL2U PW9130G2000R-XL2UEU PW9130G2000R-XL2UAU	86.5 × 438 × 600 mm (3.4″ × 17.2″ × 23.6″)	29.0 kg (63.9 lb)
PW9130L2500R-XL2U PW9130G2500R-XL2U PW9130G2500R-XL2UEU PW9130L3000R-XL2U PW9130G3000R-XL2U PW9130i3000R-XL2U PW9130G3000R-XL2UEU PW9130G3000R-XL2UAU	86.5 × 438 × 600 mm (3.4″ × 17.2″ × 23.6″)	29.5 kg (65.0 lb)
Model (Rackmount EBM)	**Dimensions (H × W × D)**	**Weight**
PW9130N1000R-EBM2U	86.5 × 438 × 430 mm (3.4″ × 17.2″ × 16.9″)	22.1 kg (48.7 lb)
PW9130N1500R-EBM2U	86.5 × 438 × 430 mm (3.4″ × 17.2″ × 16.9″)	28.1 kg (62.0 lb)
PW9130N3000R-EBM2U	86.5 × 438 × 600 mm (3.4″ × 17.2″ × 23.6″)	41.0 kg (90.6 lb)

Table 13. Weights and Dimensions (Tower Models)

Model (Tower UPS)	Dimensions (H × W × D)	Weight
PW9130L700T-XL PW9130i700T-XL PW9130G700T-XLAU	231* × 160 × 354 mm (9.09″* × 6.30″ × 13.94″)	12.2 kg (26.9 lb)
PW9130L1000T-XL PW9130G1000T-XL PW9130i1000T-XL PW9130G1000T-XLEU PW9130G1000T-XLAU	231* × 160 × 384 mm (9.09″* × 6.30″ × 15.12″)	14.5 kg (32.0 lb)
PW9130L1500T-XL PW9130i1500T-XL PW9130G1500T-XLAU	231* × 160 × 434 mm (9.09″* × 6.30″ × 17.09″)	19.0 kg (41.9 lb)
PW9130L2000T-XL PW9130G2000T-XL PW9130i2000T-XL PW9130G2000T-XLEU PW9130G2000T-XLAU PW9130L3000T-XL PW9130G3000T-XL PW9130i3000T-XL PW9130G3000T-XLEU PW9130G3000T-XLAU	325** × 214 × 412 mm (12.80″** × 8.43″ × 16.22″)	34.5 kg (76.1 lb)
Model (Tower EBM)	**Dimensions (H × W × D)**	**Weight**
PW9130N1000T-EBM	231* × 160 × 384 mm (9.09″* × 6.30″ × 15.12″)	18.5 kg (40.8 lb)
PW9130N1500T-EBM	231* × 160 × 434 mm (9.09″* × 6.30″ × 17.09″)	24.3 kg (53.6 lb)
PW9130N3000T-EBM	325** × 214 × 412 mm (12.80″** × 8.43″ × 16.22″)	50.0 kg (110.3 lb)

* 252 mm (9.92″) with feet

** 346 mm (13.62″) with feet

Table 14. Electrical Input (All Models)

Nominal Frequency	50/60 Hz auto-sensing
Frequency Range	40–70 Hz before transfer to battery
Bypass Voltage Range	+10/-15% of nominal (default)
Noise Filtering	MOVs for normal and common mode noise

Table 15. Electrical Input (Rackmount Models)

Model	Default Input (Voltage/Current)	Selectable Input Voltages	Voltage Range at 100% Load
PW9130L700R-XL2U	120V / 5.8A	100*, 110**, 120, 127	80–138 Vac
PW9130L1000R-XL2U	120V / 8.3A	100*, 110**, 120, 127	80–138 Vac
PW9130L1500R-XL2U	120V / 12.5A	100*, 110**, 120, 127	80–138 Vac
PW9130L2000R-XL2U	120V / 16.7A	100*, 110**, 120, 127	90–138 Vac
PW9130L2500R-XL2U	120V / 20.8A	100*, 110**, 120, 127	90–138 Vac
PW9130L3000R-XL2U	120V / 25A	100*, 110**, 120, 127	90–138 Vac
PW9130G1000R-XL2U	208V / 4.8A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130G2000R-XL2U	208V / 9.6A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G2500R-XL2U	208V / 12A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G3000R-XL2U	208V / 14.4A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130i1000R-XL2U	230V / 4.3A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130i1500R-XL2U	230V / 6.5A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130i2000R-XL2U	230V / 8.7A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130i3000R-XL2U	230V / 13.0A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G1000R-XL2UEU	208V / 4.8A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G2000R-XL2UEU	208V / 9.6A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G2500R-XL2UEU	208V / 12A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G3000R-XL2UEU	208V / 14.4A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G1000R-XL2UAU	240V / 4.4A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130G1500R-XL2UAU	240V / 6.25A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130G2000R-XL2UAU	240V / 8.7A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G3000R-XL2UAU	240V / 13.0A	200*, 208**, 220, 230, 240	180–276 Vac

* 100V and 200V are derated by 20%.

** 110V and 208V are derated by 10%.

Table 16. Electrical Input (Tower Models)

Model	Default Input (Voltage/Current)	Selectable Input Voltages	Voltage Range at 100% Load
PW9130L700T-XL	120V / 5.8A	100*, 110**, 120, 127	80–138 Vac
PW9130L1000T-XL	120V / 8.3A	100*, 110**, 120, 127	80–138 Vac
PW9130L1500T-XL	120V / 12.5A	100*, 110**, 120, 127	80–138 Vac
PW9130L2000T-XL	120V / 16.7A	100*, 110**, 120, 127	90–138 Vac
PW9130L3000T-XL	120V / 25.0A	100*, 110**, 120, 127	90–138 Vac
PW9130G1000T-XL	208V / 4.4A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130G2000T-XL	208V / 8.7A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G3000T-XL	208V / 13.0A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130i700T-XL	230V / 3.0A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130i1000T-XL	230V / 4.3A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130i1500T-XL	230V / 6.5A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130i2000T-XL	230V / 8.7A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130i3000T-XL	230V / 13.0A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G1000T-XLEU	208V / 4.4A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G2000T-XLEU	208V / 8.7A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G3000T-XLEU	208V / 13.0A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G700T-XLAU	240V / 4.2A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130G1000T-XLAU	240V / 4.2A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130G1500T-XLAU	240V / 6.25A	200*, 208**, 220, 230, 240	160–276 Vac
PW9130G2000T-XLAU	240V / 8.3A	200*, 208**, 220, 230, 240	180–276 Vac
PW9130G3000T-XLAU	240V / 12.5A	200*, 208**, 220, 230, 240	180–276 Vac

* 100V and 200V are derated by 20%.
** 110V and 208V are derated by 10%.

Table 17. Electrical Input Connections (Rackmount Models)

Model	Input Connection	Input Cable
PW9130L700R-XL2U	5-15P	Attached line cord
PW9130L1000R-XL2U	5-15P	Attached line cord
PW9130L1500R-XL2U	5-15P	Attached line cord
PW9130L2000R-XL2U	5-20P	Attached line cord
PW9130L2500R-XL2U	L5-30P	Attached line cord
PW9130L3000R-XL2U	L5-30P	Attached line cord
PW9130G1000R-XL2U	IEC C14-10A	L6-20P to C14 coupler
PW9130G2000R-XL2U	IEC C14-10A	L6-20P to C14 coupler
PW9130G2500R-XL2U	IEC C20-16A	L6-20P to C20 coupler
PW9130G3000R-XL2U	IEC C20-16A	L6-20P to C20 coupler
PW9130i1000R-XL2U	IEC C14-10A	Schuko 10A to IEC 320-10A
PW9130i1500R-XL2U	IEC C14-10A	Schuko 10A to IEC 320-10A
PW9130i2000R-XL2U	IEC C14-10A	Schuko 10A to IEC 320-10A
PW9130i3000R-XL2U	IEC C20-16A	Schuko 16A to IEC 320-16A
PW9130G1000R-XL2UEU	IEC C14-10A	L6-20P to C14 coupler
PW9130G2000R-XL2UEU	IEC C14-10A	L6-20P to C14 coupler
PW9130G2500R-XL2UEU	IEC C20-16A	L6-20P to C20 coupler
PW9130G3000R-XL2UEU	IEC C20-16A	L6-20P to C20 coupler
PW9130G1000R-XL2UAU	IEC C14-10A	Aust. 10A to IEC 320-10A
PW9130G1500R-XL2UAU	IEC C14-10A	Aust. 10A to IEC 320-10A
PW9130G2000R-XL2UAU	IEC C14-10A	Aust. 10A to IEC 320-10A
PW9130G3000R-XL2UAU	IEC C20-16A	Aust. 15A to IEC 320-16A

Table 18. Electrical Input Connections (Tower Models)

Model	Input Connection	Input Cable
PW9130L700T-XL	5-15P	Attached line cord
PW9130L1000T-XL	5-15P	Attached line cord
PW9130L1500T-XL	5-15P	Attached line cord
PW9130L2000T-XL	5-20P	Attached line cord
PW9130L3000T-XL	L5-30P	Attached line cord
PW9130G1000T-XL	IEC C14-10A	L6-20P to C14 coupler
PW9130G2000T-XL	IEC C14-10A	L6-20P to C14 coupler
PW9130G3000T-XL	IEC C20-16A	L6-20P to C20 coupler
PW9130i700T-XL	IEC C14-10A	Schuko 10A to IEC 320-10A
PW9130i1000T-XL	IEC C14-10A	Schuko 10A to IEC 320-10A
PW9130i1500T-XL	IEC C14-10A	Schuko 10A to IEC 320-10A
PW9130i2000T-XL	IEC C14-10A	Schuko 10A to IEC 320-10A
PW9130i3000T-XL	IEC C20-16A	Schuko 16A to IEC 320-16A
PW9130G1000T-XLEU	IEC C14-10A	L6-20P to C14 coupler
PW9130G2000T-XLEU	IEC C14-10A	L6-20P to C14 coupler
PW9130G3000T-XLEU	IEC C20-16A	L6-20P to C20 coupler
PW9130G700T-XLAU	IEC C14-10A	Aust. 10A to IEC 320-10A
PW9130G1000T-XLAU	IEC C14-10A	Aust. 10A to IEC 320-10A
PW9130G1500T-XLAU	IEC C14-10A	Aust. 10A to IEC 320-10A
PW9130G2000T-XLAU	IEC C14-10A	Aust. 10A to IEC 320-10A
PW9130G3000T-XLAU	IEC C20-16A	Aust. 15A to IEC 320-16A

Table 19. Electrical Output (All Models)

All Models	Normal Mode	Battery Mode
Voltage Regulation	±2%	Nominal output voltage ±3%
Efficiency	>95% (High Efficiency mode), >88%	>79.5% (700 VA), >82% (1000–1500 VA), >84% (2000–3000 VA)
Frequency Regulation	Sync with line ±3 Hz of nominal line frequency (outside this range: ±0.1 Hz of auto-selected nominal frequency)	±0.1 Hz of auto-selected nominal frequency
	Low Voltage Models	**High Voltage Models**
Nominal Outputs	100/110/120/127V (voltage configurable or auto-sensing) 1000/1500/2000/3000 VA 0.9/1.35/1.8/2.7 kW	200/208/220/230/240V (voltage configurable or auto-sensing) 1000/1500/2000/3000 VA 0.9/1.35/1.8/2.7 kW
Frequency	50 or 60 Hz, autosensing or configurable as a frequency converter	
Output Overload (Normal Mode)	100–102%: Activates Overload alarm. (Level 1) 102–129%: Load transfers to Bypass mode after 12 seconds. (Level 2) 130–149%: Load transfers to Bypass mode after 2 seconds. (Level 3) ≥150%: Load transfers to Bypass mode after 100 ms. (Level 4) NOTE Default configuration transfers immediately to Bypass at >102%.	
Output Overload (Bypass Mode)	100–109%: Activates Overload alarm. (Level 1) 110–129%: UPS shuts down after 5 minutes. (Level 2) 130–149%: UPS shuts down after 15 seconds. (Level 3) ≥150%: UPS shuts down after 300 ms. (Level 4)	
Output Overload (Battery Mode)	100–102%: Activates Overload alarm. (Level 1) 102–129%: UPS shuts down after 12 seconds. (Level 2) 130–149%: UPS shuts down after 2 seconds. (Level 3) ≥150%: UPS shuts down after 100 ms. (Level 4)	
Voltage Waveform	Sine wave	
Harmonic Distortion	<3% THD on linear load; <5% THD on non-linear load	
Transfer Time	Online mode: 0 ms (no break) High Efficiency mode: 5 ms maximum (due to loss of utility)	
Power Factor	0.9	
Load Crest Factor	3 to 1	

Table 20. Electrical Output Connections (Rackmount Models)

Model	Output Connections	Output Cables
PW9130L700R-XL2U	(6) 5-15R	None
PW9130L1000R-XL2U	(6) 5-15R	None
PW9130L1500R-XL2U	(6) 5-15R	None
PW9130L2000R-XL2U	(1) L5-20R, (6) 5-20T	None
PW9130L2500R-XL2U	(1) L5-30R, (6) 5-20T, (2) 20A AC breakers	None
PW9130L3000R-XL2U	(1) L5-30R, (6) 5-20T, (2) 20A AC breakers	None
PW9130G1000R-XL2U	(1) L6-20, (2) 6-20R	None
PW9130G2000R-XL2U	(1) L6-20, (3) 6-20R	None
PW9130G2500R-XL2U	(1) L6-30R, (1) L6-20R, (1) 6-20R	None
PW9130G3000R-XL2U	(1) L6-30R, (1) L6-20R, (1) 6-20R	None
PW9130i1000R-XL2U	(6) IEC 320-10A	(2) IEC-IEC 10A, (1) IEC 320-10A to Schuko 3-strip
PW9130i1500R-XL2U	(6) IEC 320-10A	(2) IEC-IEC 10A, (1) IEC 320-10A to Schuko 3-strip
PW9130i2000R-XL2U	(8) IEC 320-10A, (1) IEC 320-16A	(2) IEC-IEC 10A, (1) IEC 320-16A to Schuko 3-strip
PW9130i3000R-XL2U	(8) IEC 320-10A, (1) IEC 320-16A	(2) IEC-IEC 10A, (1) IEC 320-16A to Schuko 3-strip
PW9130G1000R-XL2UEU	(6) IEC 320-10A	None
PW9130G2000R-XL2UEU	(8) IEC 320-10A, (1) IEC 320-16A	None
PW9130G2500R-XL2UEU	(8) IEC 320-10A, (1) IEC 320-16A	None
PW9130G3000R-XL2UEU	(8) IEC 320-10A, (1) IEC 320-16A	None
PW9130G1000R-XL2UAU	(4) C13, (2) Aust 10A	(2) IEC-IEC 10A
PW9130G1500R-XL2UAU	(4) C13, (2) Aust 10A	(2) IEC-IEC 10A
PW9130G2000R-XL2UAU	(4) C13, (4) Aust 10A	(2) IEC-IEC 10A
PW9130G3000R-XL2UAU	(4) C13, (1) C19, (3) Aust 10A	(2) IEC-IEC 10A, (1) IEC-IEC 15A

Table 21. Electrical Output Connections (Tower Models)

Model	Output Connections	Output Cables
PW9130L700T-XL	(6) 5-15R	None
PW9130L1000T-XL	(6) 5-15R	None
PW9130L1500T-XL	(6) 5-15R	None
PW9130L2000T-XL	(1) L5-20R, (4) 5-20T	None
PW9130L3000T-XL	(1) L5-30R, (4) 5-20T, (2) 20A AC breakers	None
PW9130G1000T-XL	(1) L6-20, (2) 6-20R	None
PW9130G2000T-XL	(1) L6-20, (4) 6-20R	None
PW9130G3000T-XL	(1) L6-30R, (1) L6-20R, (2) 6-20R	None
PW9130i700T-XL	(6) IEC 320-10A	(2) IEC-IEC 10A, (1) IEC 320-10A to Schuko 3-strip
PW9130i1000T-XL	(6) IEC 320-10A	(2) IEC-IEC 10A, (1) IEC 320-10A to Schuko 3-strip
PW9130i1500T-XL	(6) IEC 320-10A	(2) IEC-IEC 10A, (1) IEC 320-10A to Schuko 3-strip
PW9130i2000T-XL	(8) IEC 320-10A, (1) IEC 320-16A	(2) IEC-IEC 10A, (1) IEC 320-16A to Schuko 3-strip
PW9130i3000T-XL	(8) IEC 320-10A, (1) IEC 320-16A	(2) IEC-IEC 10A, (1) IEC 320-16A to Schuko 3-strip
PW9130G1000T-XLEU	(6) IEC 320-10A	None
PW9130G2000T-XLEU	(8) IEC 320-10A, (1) IEC 320-16A	None
PW9130G3000T-XLEU	(8) IEC 320-10A, (1) IEC 320-16A	None
PW9130G700T-XLAU	(4) Aust 10A	None
PW9130G1000T-XLAU	(4) Aust 10A	None
PW9130G1500T-XLAU	(4) Aust 10A	None
PW9130G2000T-XLAU	(1) C13, (5) Aust 10A	None
PW9130G3000T-XLAU	(1) C19, (5) Aust 15A	None

Table 22. Environmental and Safety (All Models)

	120 Vac Models	208/230/240 Vac Models
Surge Suppression	ANSI C62.41 Category B3 (6 KV Ring and Combination)	EN 61000-2-2 EN 61000-4-2, Level 3 EN 61000-4-3, Level 2 EN 61000-4-4, Level 2 (also on signal ports) EN 6100-4-5, Level 3 Criteria A EN 61000-4-6, Level 2 EN 61000-4-8, Level 2 EN 6100-4-11
EMC Certifications	≤1500 VA: FCC Class B, VCCI Class B, EN 55022 Class B ≥2000 VA: FCC Class A, VCCI Class A, EN 55022 Class A	CE per IEC/EN 62040-2, Emissions: Category C1, Immunity: Category C2
EMC (Emissions)	IEC 62040-2:ed2:2005 / EN 62040-2:2006	
Safety Conformance	UL 1778, IEC 62040-1-1, IEC 60950-1	
Agency Markings	CE, UL, CUL, NOM	
Operating Temperature	0°C to 40°C (32°F to 104°F) in Online mode, with linear derating for altitude NOTE Thermal protection switches load to Bypass in case of overheating.	
Storage Temperature	-20°C to 40°C (-4°F to 104°F) with batteries -25°C to 55°C (-13°F to 131°F) without batteries	
Transit Temperature	-25°C to 55°C (-13°F to 131°F)	
Relative Humidity	5–90% noncondensing	
Operating Altitude	Up to 3,000 meters (9,843 ft) above sea level	
Transit Altitude	Up to 10,000 meters (32,808 ft) above sea level	
Audible Noise	<50 dBA at 1 meter typical	
Leakage Current	<1.5 mA	

Table 23. Battery Runtimes (in Minutes) at 100% Load (Rack Models)

Model	Internal Batteries	+ 1 EBM	+ 2 EBMs	+ 3 EBMs	+ 4 EBMs
PW9130L700R-XL2U	9	41	72	105	130
PW9130L1000R-XL2U	5	30	55	83	108
PW9130G1000R-XL2U PW9130i1000R-XL2U PW9130G1000R-XL2UEU PW9130G1000R-XL2UAU	7	29	51	81	98
PW9130L1500R-XL2U	5	23	48	67	91
PW9130i1500R-XL2U PW9130G1500R-XL2UAU	5	24	44	72	89
PW9130L2000R-XL2U	6	33	59	88	112
PW9130G2000R-XL2U PW9130i2000R-XL2U PW9130G2000R-XL2UEU PW9130G2000R-XL2UAU	6	33	59	88	119
PW9130L2500R-XL2U PW9130G2500R-XL2U PW9130G2500R-XL2UEU	4	26	47	71	95
PW9130L3000R-XL2U	3	20	36	53	71
PW9130G3000R-XL2U PW9130i3000R-XL2U PW9130G3000R-XL2UEU PW9130G3000R-XL2UAU	3	18	34	53	69

NOTE Battery times are approximate and vary depending on the load configuration and battery charge.

Table 24. Battery Runtimes (in Minutes) at 100% Load (Tower Models)

Model	Internal Batteries	+ 1 EBM	+ 2 EBMs	+ 3 EBMs	+ 4 EBMs
PW9130L700T-XL PW9130i700T-XL PW9130G700T-XLAU	6	N/A	N/A	N/A	N/A
PW9130L1000T-XL	5	30	55	83	108
PW9130G1000T-XL PW9130i1000T-XL PW9130G1000T-XLEU PW9130G1000T-XLAU	7	29	51	81	98
PW9130L1500T-XL	5	23	48	67	91
PW9130i1500T-XL PW9130G1500T-XLAU	5	24	44	72	89
PW9130L2000T-XL	9	43	81	114	155
PW9130G2000T-XL PW9130i2000T-XL PW9130G2000T-XLEU PW9130G2000T-XLAU	12	48	93	137	161
PW9130L3000T-XL	6	24	50	71	94
PW9130G3000T-XL PW9130i3000T-XL PW9130G3000T-XLEU PW9130G3000T-XLAU	7	32	51	87	104

NOTE Battery times are approximate and vary depending on the load configuration and battery charge.

Table 25. Battery

	Internal Batteries	EBMs
Rackmount Configuration	700–1000 VA models: 36 Vdc (3 12V, 9 Ah) 1500 VA models: 48 Vdc (4 12V, 9 Ah) 2000–3000 VA models: 72 Vdc (6 12V, 9 Ah)	PW9130N1000R-EBM2U: 36 Vdc (2x3 12V, 9 Ah) PW9130N1500R-EBM2U: 48 Vdc (2x4 12V, 9 Ah) PW9130N3000R-EBM2U: 72 Vdc (2x6 12V, 9 Ah)
Tower Configuration	700 VA models: 24 Vdc (2 12V, 9 Ah) 1000 VA models: 36 Vdc (3 12V, 9 Ah) 1500 VA models: 48 Vdc (4 12V, 9 Ah) 2000–3000 VA models: 96 Vdc (8 12V, 9 Ah)	PW9130N1000T-EBM: 36 Vdc (2x3 12V, 9 Ah) PW9130N1500T-EBM: 48 Vdc (2x4 12V, 9 Ah) PW9130N3000T-EBM: 96 Vdc (2x8 12V, 9 Ah)
Fuses	Not applicable	(4) 30A/125 Vdc fuses per EBM
Type	Sealed, maintenance-free, valve-regulated, lead-acid, with minimum 3-year float service life at 25°C (77°F)	
Monitoring	Advanced monitoring for earlier failure detection and warning	
Recharge Time (to 90%)	Internal batteries: 3 hours 1 EBM: 9 hours; 2 EBMs: 15 hours; 3 EBMs: 21 hours; 4 EBMs: 27 hours	
Battery Port	External three-pole Anderson connector on UPS for connection to EBM	

Rear Panels

This section shows each model's rear panel. Receptacles in Load Segment 1 are shaded.

Table 10 on page 76 lists the rackmount models. Table 11 on page 77 lists the tower models. Input and output components for each model are listed in Table 15 through Table 21 (pages 80 through 86).

For a description of communication features, see Figure 18 on page 53.

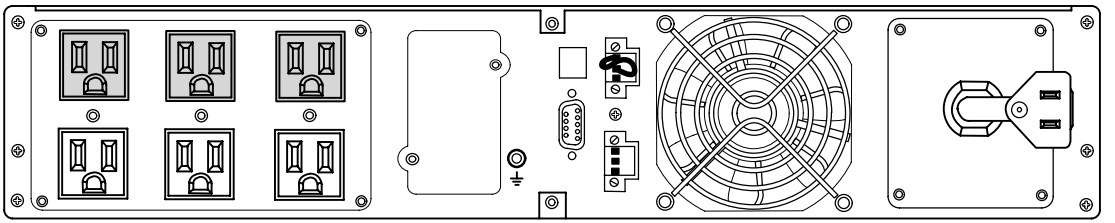


Figure 28. Models PW9130L700R-XL2U, PW9130L1000R-XL2U

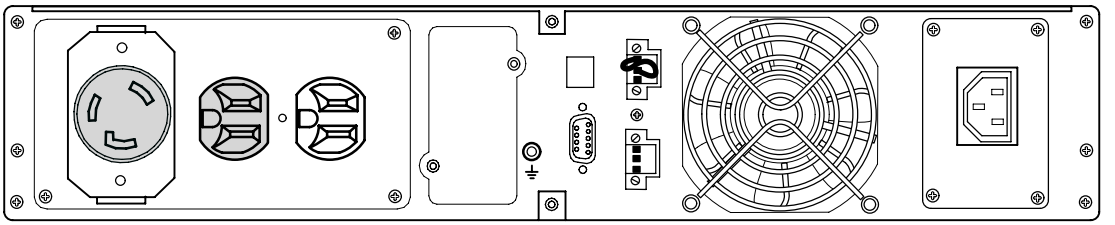


Figure 29. Model PW9130G1000R-XL2U

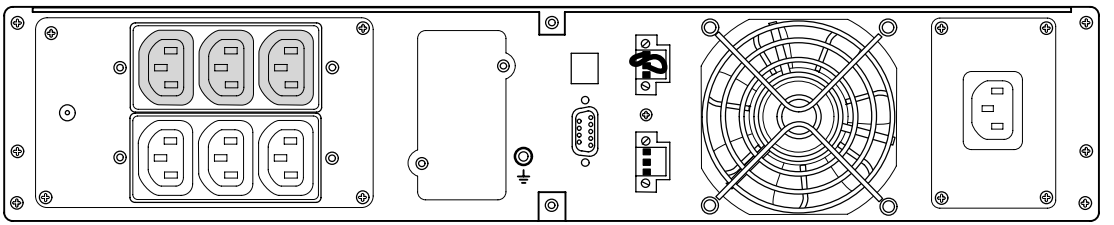


Figure 30. Models PW9130i1000R-XL2U, PW9130G1000R-XL2UEU

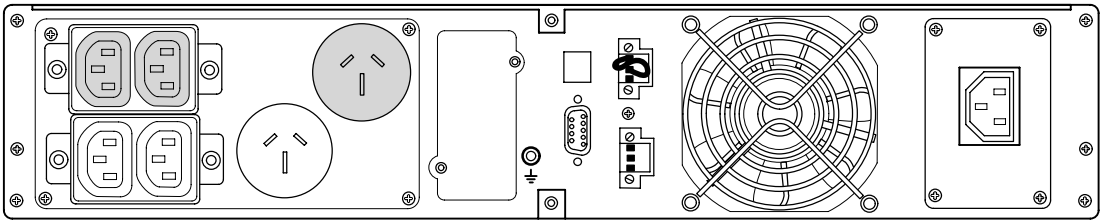


Figure 31. Model PW9130G1000R-XL2UAU

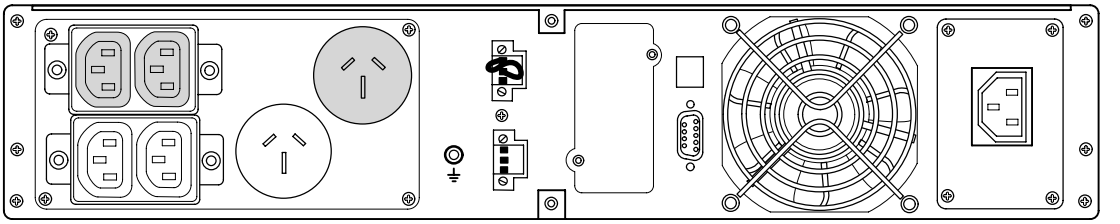


Figure 32. Model PW9130G1500R-XL2UAU

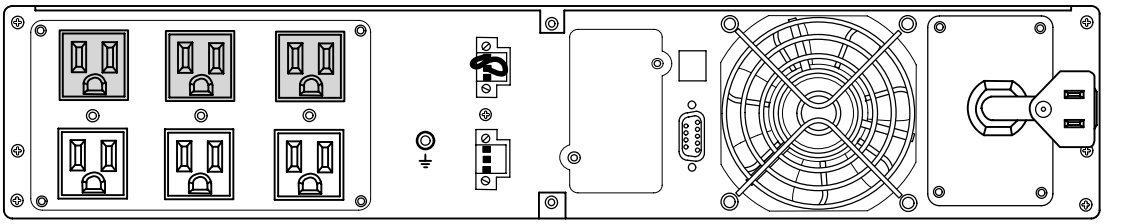


Figure 33. Model PW9130L1500R-XL2U

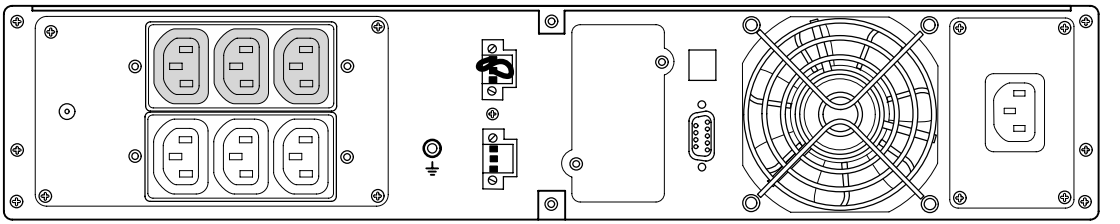


Figure 34. Model PW9130i1500R-XL2U

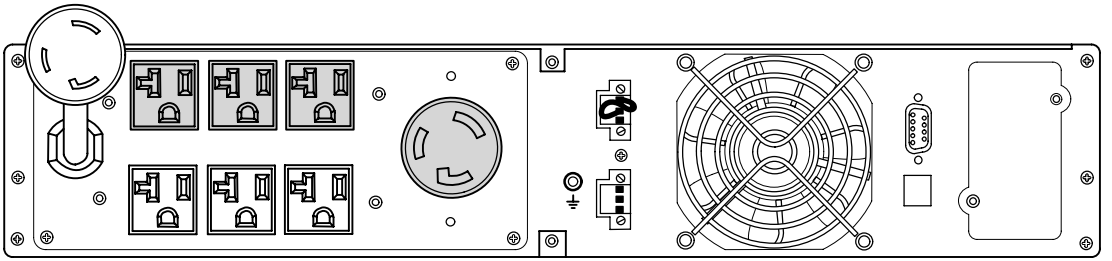


Figure 35. Model PW9130L2000R-XL2U

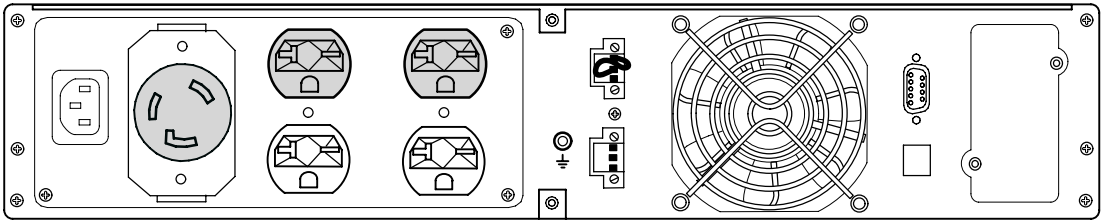


Figure 36. Model PW9130G2000R-XL2U

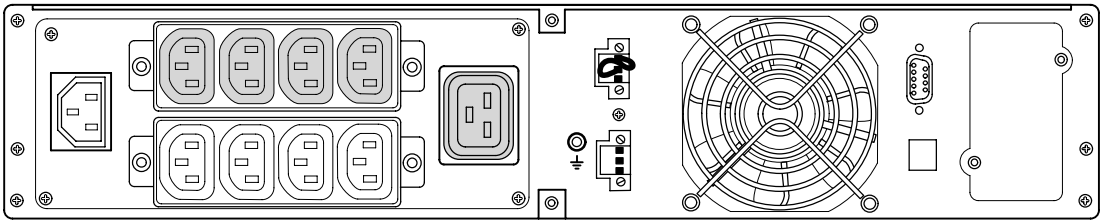


Figure 37. Models PW9130i2000R-XL2U, PW9130G2000R-XL2UEU

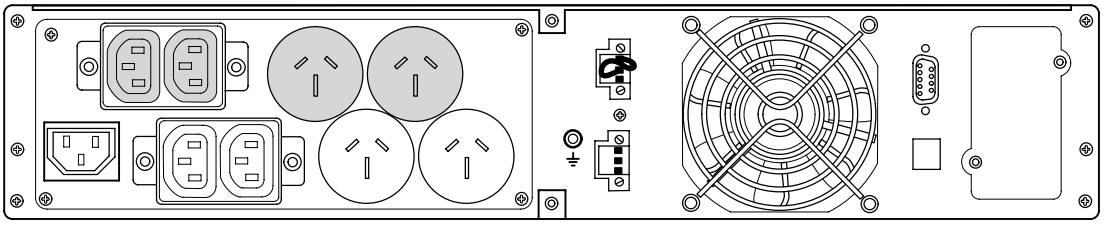


Figure 38. Model PW9130G2000R-XL2UAU

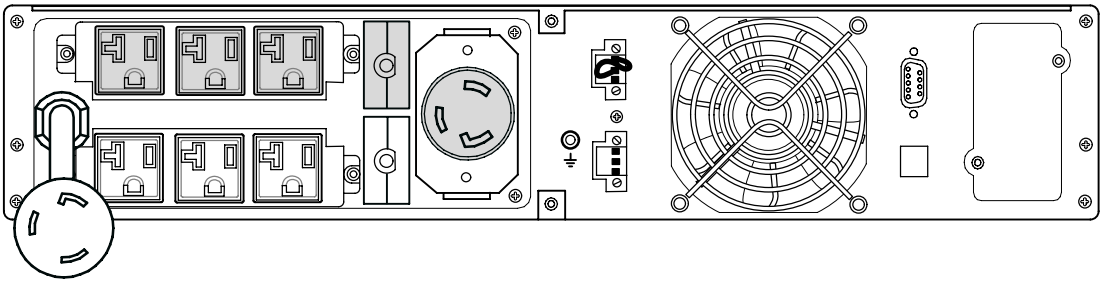


Figure 39. Models PW9130L2500R-XL2U, PW9130L3000R-XL2U

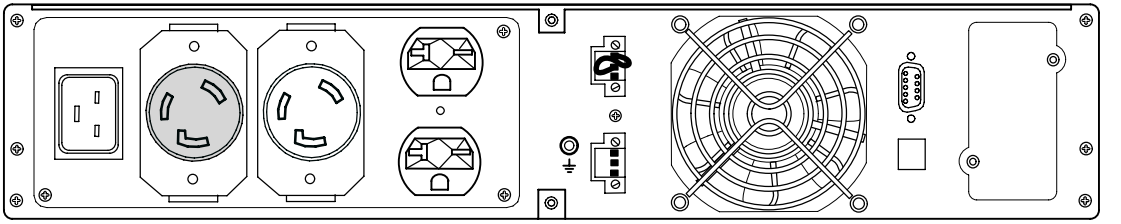


Figure 40. Models PW9130G2500R-XL2U, PW9130G3000R-XL2U

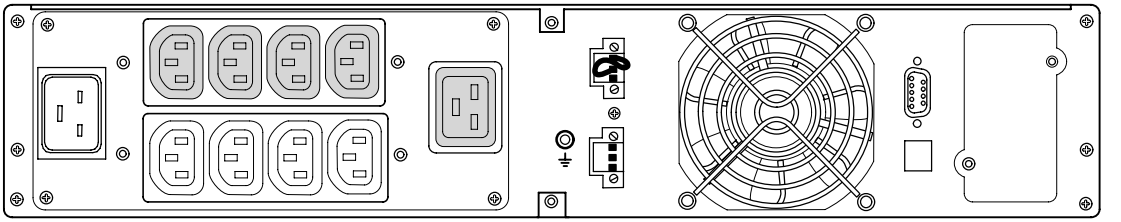


Figure 41. Models PW9130G2500R-XL2UEU, PW9130i3000R-XL2U, PW9130G3000R-XL2UEU

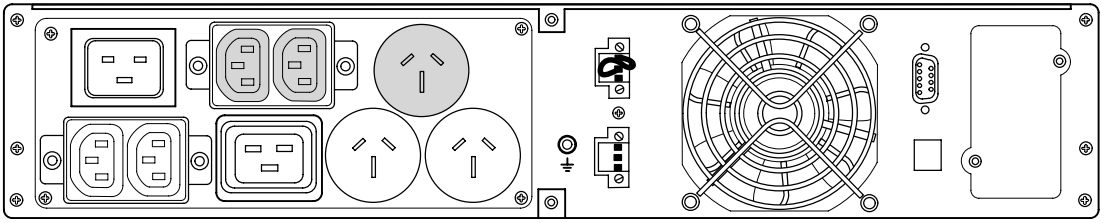


Figure 42. Model PW9130G3000R-XL2UAU

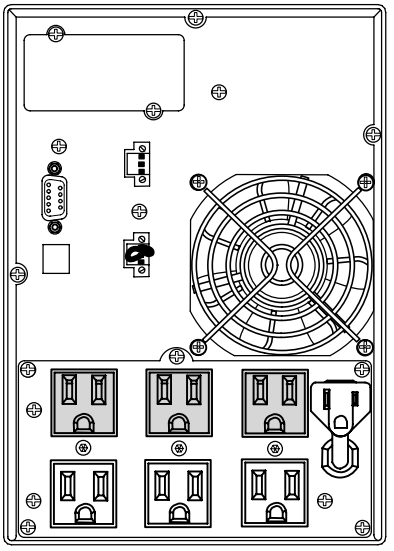


Figure 43. Model PW9130L700T-XL

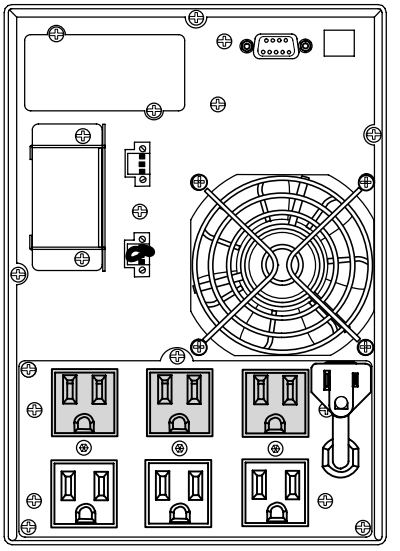


Figure 44. Model PW9130L1000T-XL

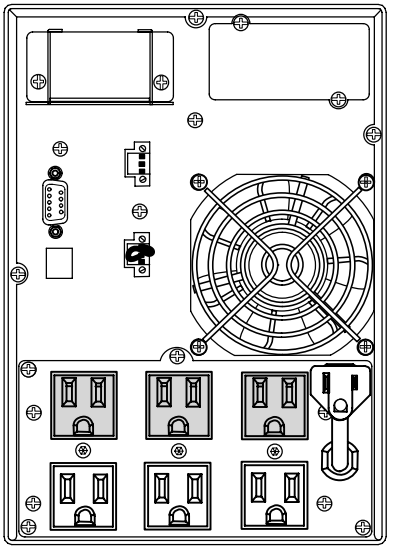


Figure 45. Model PW9130L1500T-XL

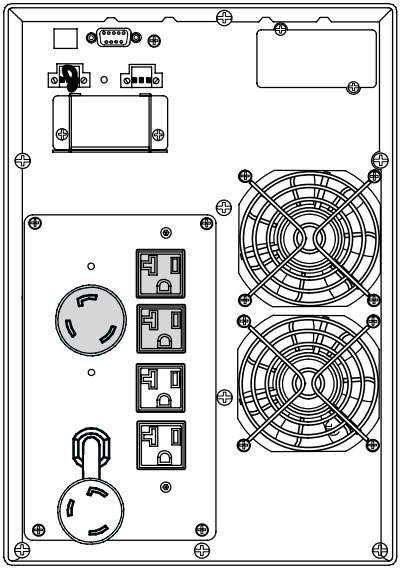


Figure 46. Model PW9130L2000T-XL

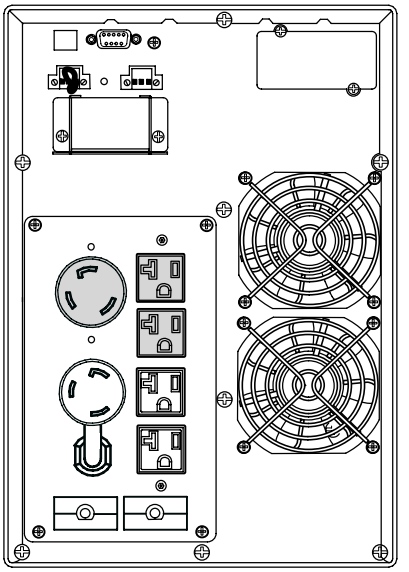


Figure 47. Model PW9130L3000T-XL

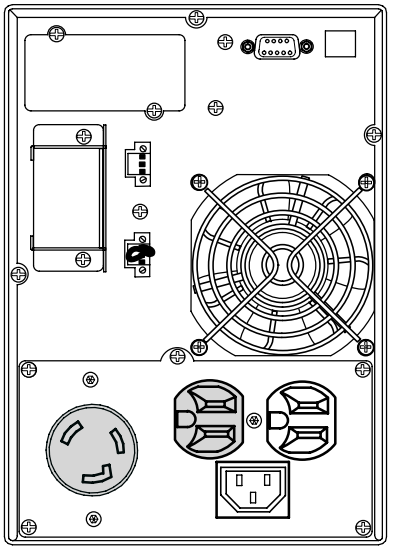


Figure 48. Model PW9130G1000T-XL

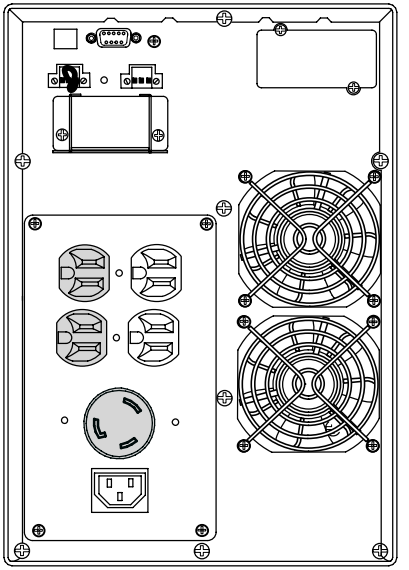


Figure 49. Model PW9130G2000T-XL

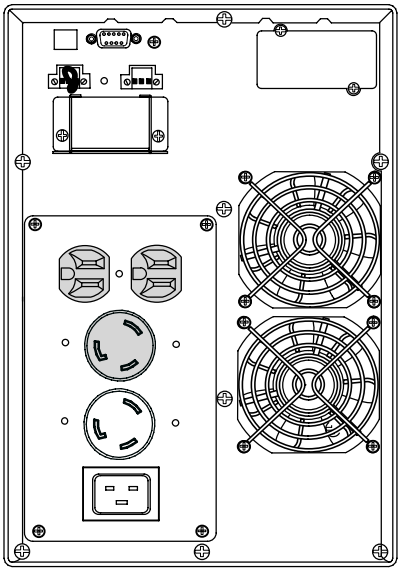


Figure 50. Model PW9130G3000T-XL

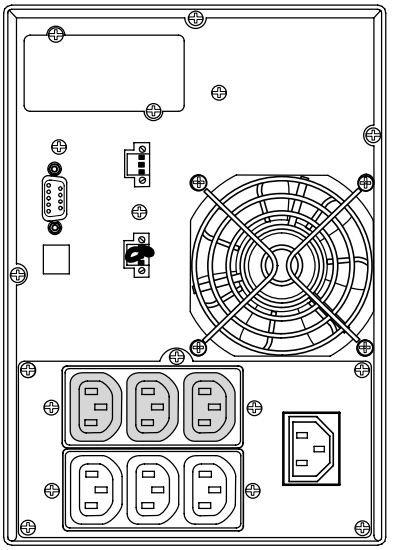


Figure 51. Model PW9130i700T-XL

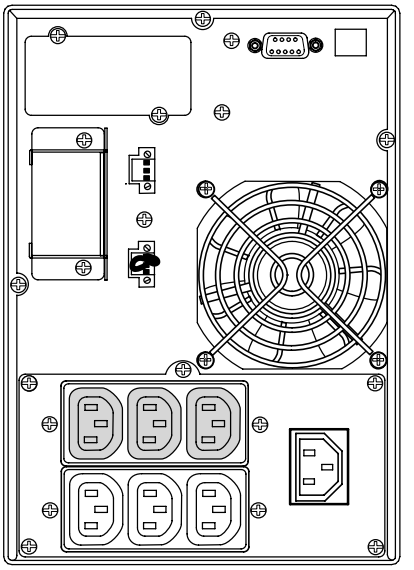


Figure 52. Model PW9130G1000T-XLEU and PW9130i1000T-XL

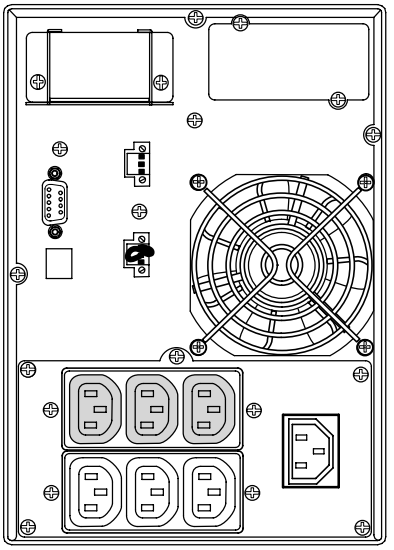


Figure 53. Model PW9130i1500T-XL

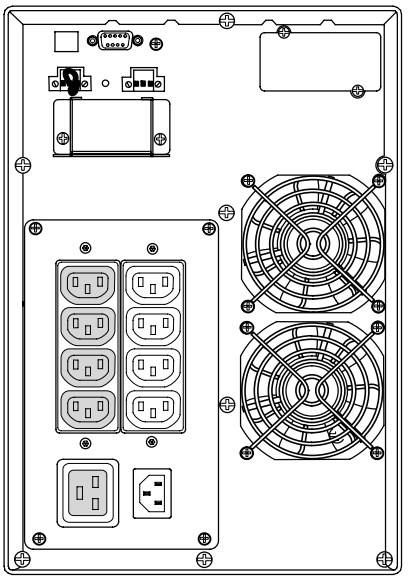


Figure 54. Models PW9130G2000T-XLEU and PW9130i2000T-XL

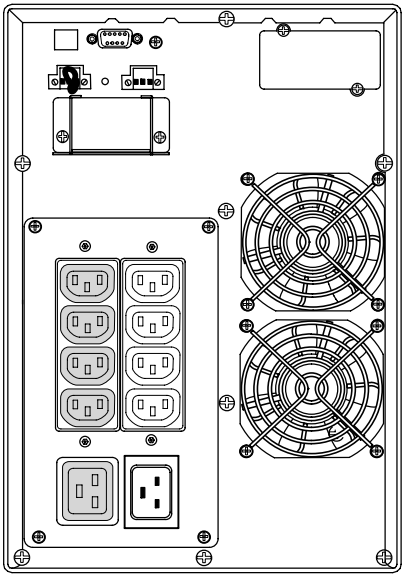


Figure 55. Models PW9130G3000T-XLEU and PW9130i3000T-XL

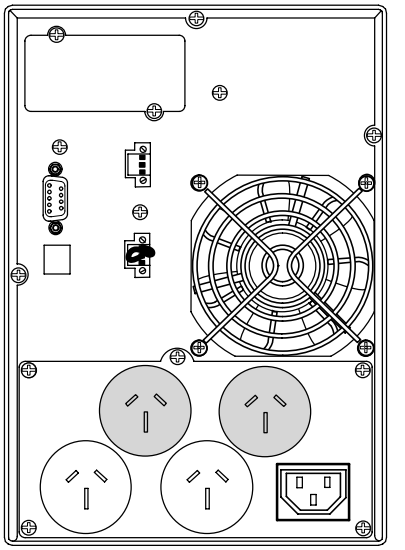


Figure 56. Model PW9130G700T-XLAU

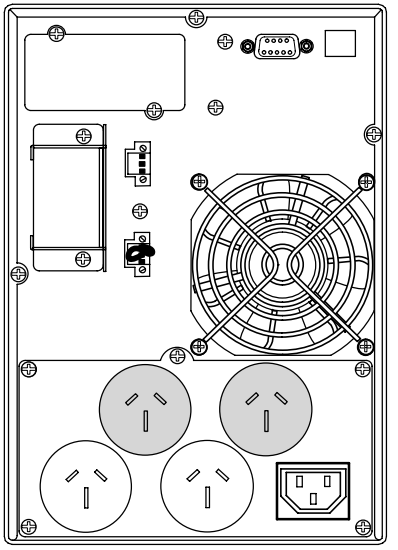


Figure 57. Model PW9130G1000T-XLAU

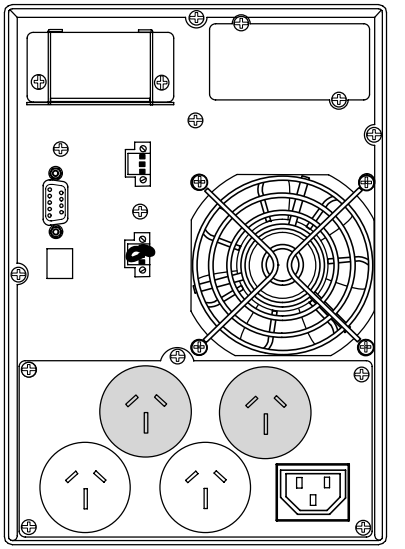


Figure 58. Model PW9130G1500T-XLAU

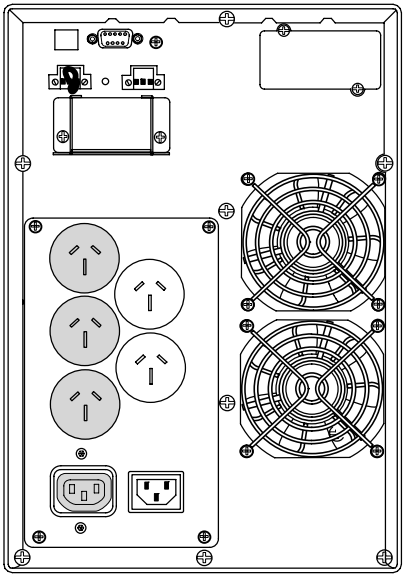


Figure 59. Model PW9130G2000T-XLAU

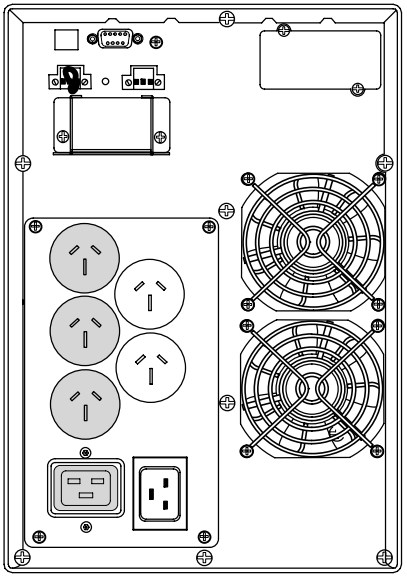


Figure 60. Model PW9130G3000T-XLAU

Chapter 8 Troubleshooting

The Eaton 9130 is designed for durable, automatic operation and also alerts you whenever potential operating problems may occur. Usually the alarms shown by the control panel do not mean that the output power is affected. Instead, they are preventive alarms intended to alert the user.

In general:

- Events are silent conditions that are recorded in the Event Log as status information, such as "Clock Set Done."
- Notices are announced by a beep every 5 seconds, recorded in the Event Log, and displayed on the LCD. Examples are "UPS on Battery" and "UPS on Bypass."
- Alarms are announced by a beep every second, recorded in the Event Log, displayed on the LCD, and the Alarm indicator illuminates. Examples are "Output Overload" and "Heatsink Overtemperature."

Use the following troubleshooting chart to determine the UPS alarm condition.

Typical Alarms and Conditions

To check the UPS Status menu for a list of active alarms:

1. Press any button on the front panel display to activate the menu options.
2. Press the ↓ button until UPS STATUS displays.
3. Press the Enter button to display the list of active alarms.

To check the Event Log for a history of conditions:

1. Press any button on the front panel display to activate the menu options.
2. Press the ↓ button until EVENT LOG displays.
3. Press the Enter button to display the list of conditions.

You can also retrieve the entire Event Log in ASCII format. See "Retrieving the Event Log" on page 47.

The following table describes typical alarms and conditions.

Alarm or Condition	Possible Cause	Action
On Battery  LED is on. 1 beep every 5 seconds.	A utility failure has occurred and the UPS is in Battery mode.	The UPS is powering the equipment with battery power. Prepare your equipment for shutdown.
Battery Low  LED is flashing slowly. 1 beep every second.	The UPS is in Battery mode and the battery is running low.	This warning is approximate, and the actual time to shutdown may vary significantly. Depending on the UPS load and number of Extended Battery Modules (EBMs), the "Battery Low" warning may occur before the batteries reach 25% capacity. See Table 23 on page 88 for estimated runtimes.
On Bypass  LED is on. 1 beep every 5 seconds.	The UPS is in Bypass mode.	The equipment transferred to bypass utility power. Battery mode is not available and your equipment is not protected; however, the utility power continues to be passively filtered by the UPS. Check for one of the following alarms: overtemperature, overload, or UPS failure.
On Bypass  LED is on. No beeping.	The UPS is on bypass while operating on the High Efficiency setting.	The equipment transferred to bypass utility power as a normal function of High Efficiency operation. Battery mode is available and your equipment is protected.
Batteries Disconnected  LED is on. 1 beep every second.	The UPS does not recognize the internal batteries.	If the condition persists, contact your service representative.
	The batteries are disconnected.	Verify that all batteries are properly connected. If the condition persists, contact your service representative.

Alarm or Condition	Possible Cause	Action
Overload  LED is on. 1 beep every second.	Power requirements exceed the UPS capacity (greater than 100% of nominal; see page 84 for specific output overload ranges).	Remove some of the equipment from the UPS. The UPS continues to operate, but may switch to Bypass mode or shut down if the load increases. The alarm resets when the condition becomes inactive.
Overtemperature  LED is on. 1 beep every second.	The UPS internal temperature is too high or a fan has failed. At the warning level, the UPS generates the alarm but remains in the current operating state. If the temperature rises another 10°C, the UPS transfers to Bypass mode or shuts down if bypass is unusable.	If the UPS transferred to Bypass mode, the UPS will return to normal operation when the temperature drops 5°C below the warning level. If the condition persists, shut down the UPS. Clear vents and remove any heat sources. Allow the UPS to cool. Ensure the airflow around the UPS is not restricted. Restart the UPS. If the condition continues to persist, contact your service representative.
Battery Overvoltage  LED is on. 1 beep every second.	The UPS battery voltage is too high.	The UPS turns off the charger until the next power recycle. Contact your service representative.
Site Wiring Fault  LED is on. 1 beep every second.	**"L" Models Only.** Ground wire connection does not exist, or the line and neutral wires are reversed in the wall outlet.	Have a qualified electrician correct the wiring.
	"G" Models Only. Input is phase to phase (neutral is not bonded to ground).	Disable the Site Wiring Fault Alarm setting (see "User Settings" on page 40).
	"i" and "G (AU)" Models Only. The polarity of the UPS input power cord connector is incorrect.	Rotate the Schuko input connector.
	"i" and "G (AU)" Models Only. The ground wire connection does not exist.	Have a qualified electrician correct the wiring. If the UPS is installed to input supply without ground, disable the "Site Wiring Fault Alarm" setting (see "User Settings" on page 40).
The UPS does not provide the expected backup time.	The batteries need charging or service.	Apply utility power for 48 hours to charge the batteries. If the condition persists, contact your service representative.
Power is not available at the UPS output receptacles.	The UPS is in Standby mode.	Supply power to the connected equipment: Press the On/Off button for at least 1 second, until the front panel displays "UPS starting...".

Alarm or Condition	Possible Cause	Action
The UPS does not start.	The power cord is not connected correctly.	Check the power cord connections.
	The Remote Emergency Power-off (REPO) switch is active or the REPO connector is missing.	If the UPS Status menu displays the "Remote Emergency Power Off" notice, inactivate the REPO input.
The UPS operates normally, but some or all of the protected equipment is not on.	The equipment is not connected correctly to the UPS.	Verify that the equipment is plugged into the UPS receptacles.
Battery test did not run or was interrupted.	One of the conditions listed in "Running Automatic Battery Tests" on page 52 was not present.	Resolve the condition, then restart the test.
The UPS does not transfer to Bypass mode.	The bypass utility does not qualify.	Check the bypass utility. The UPS is receiving bypass utility power that may be unstable or in brownout conditions.
	Bypass mode is disabled.	Check that the Bypass settings are configured correctly. See "Configuring Bypass Settings" on page 48.
USB communication does not work.	The serial port communication speed is set incorrectly for USB. USB requires 9600 bps.	Check that the "Serial Port Configuration" setting is set to 9600 bps. See "User Settings" on page 40.

Silencing the Alarm

Press any button on the front panel display to silence the alarm. Check the alarm condition and perform the applicable action to resolve the condition. If the alarm status changes, the alarm beeps again, overriding the previous alarm silencing.

Service and Support

If you have any questions or problems with the UPS, call your **Local Distributor** or the **Help Desk** at one of the following telephone numbers and ask for a UPS technical representative.

United States:	1-800-843-9433 or 1-919-870-3028
Canada:	1-800-461-9166 ext 260
All other countries:	Call your local service representative

Please have the following information ready when you call for service:

- Model number
- Serial number
- Firmware version number
- Date of failure or problem
- Symptoms of failure or problem
- Customer return address and contact information

If repair is required, you will be given a Returned Material Authorization (RMA) Number. This number must appear on the outside of the package and on the Bill Of Lading (if applicable). Use the original packaging or request packaging from the Help Desk or distributor. Units damaged in shipment as a result of improper packaging are not covered under warranty. A replacement or repair unit will be shipped, freight prepaid for all warrantied units.

NOTE *For critical applications, immediate replacement may be available. Call the* ***Help Desk*** *for the dealer or distributor nearest you.*

Chapter 9 Warranty

Two-Year Limited Warranty (US and Canada)

Powerware UPS Models: 3105, 9120, 9125, 9130, 9140, and FERRUPS® up to 3.1 kVA

WARRANTOR: The warrantor for the limited warranties set forth herein is Eaton Electrical Inc., a Delaware Corporation company ("Company").

LIMITED WARRANTY: This limited warranty (this "Warranty") applies only to the original End-User (the "End-User") of any Powerware 3105, 9120, 9125, 9130, 9140, and FERRUPS up to 3.1 kVA Products (individually and collectively, the "Product") purchased on or after June 1, 2004 and cannot be transferred. This Warranty applies even in the event that the Product is initially sold by Company for resale to an End-User.

LIMITED WARRANTY PERIOD: The period covered by this Warranty for Product installed [and currently located] in the fifty (50) United States, the District of Columbia, and Canada is twenty-four (24) months from the date of purchase.

WHAT THIS LIMITED WARRANTY COVERS: The warrantor warrants that the Product and battery (individually and collectively, the "Warranted Items") are free from defects in material and workmanship. If, in the opinion of Company, a Warranted Item is defective and the defect is within the terms of this Warranty, Company's sole obligation will be to repair or replace such defective Warranted Item (including by providing service, parts and labor, as applicable), at the option of Company.

PROCEDURES FOR REPAIR OR REPLACEMENT OF WARRANTED ITEMS: The Warranted Item will be repaired or replaced at a Company site or such other location as determined by Company.

If the Warranted Item is to be replaced by Company, and the End-User supplies a credit card number or purchase order for the value of the replacement Product, Company will use commercially reasonable business efforts to ship (via standard ground shipment and at no cost to the End-User) the replacement Warranted Item to the End-User within one (1) business day after Company receives notice of the warranty claim. In such case, the End-User must return (at Company's expense) the defective Warranted Item to Company in the same packaging as the replacement Warranted Item received by the End-User or as otherwise instructed by Company. If Company does not receive the defective Warranted Item, Company will either charge the End-User's credit card, or send the End-User an invoice (which the End-User agrees to pay), for the value of the replacement Product.

If the Warranted Item is to be replaced by Company, but the End-User is unwilling or unable to supply a credit card number or purchase order for the value of the replacement Product, Company will use commercially reasonable business efforts to ship (via standard ground shipment and at no cost to the End-User) the replacement Warranted Item to the End-User within one (1) business day after Company receives the defective Product from the End-User.

In any case, Company will provide shipping instructions and will pay its designated carrier for all shipping charges for return of defective equipment and replacement of Warranted Items. Any returned Warranted Item or parts that are replaced may be new or reconditioned. All Warranted Items returned to Company and all parts replaced by Company shall become the property of Company.

WHAT THIS LIMITED WARRANTY DOES NOT COVER: This Warranty does not cover any defects or damages caused by: (a) failure to properly store the Product before installation, including the charge of batteries no later than the date indicated on the packaging; (b) shipping and delivery of the Product if shipping is FOB Factory; (c) neglect, accident, abuse, misuse, misapplication, or incorrect installation; (d) repair or alteration not authorized in writing by Company personnel or performed by an authorized Company Customer Service Engineer or Agent; (e) improper testing, operation, maintenance, adjustment, or modification of any kind not authorized in writing by Company personnel or performed by an authorized Company Customer Service Engineer or Agent; or (f) use of the Product under other than normal operating conditions or in a manner inconsistent with the Product's labels or instructions.

This Warranty is not valid if the Product's serial numbers have been removed or are illegible. Any Warranted Items repaired or replaced pursuant to this Warranty will be warranted for the remaining portion of the original Warranty subject to all the terms thereof.

Company shall not be responsible for any charges for testing, checking, removal or installation of Warranted Items.

COMPANY DOES NOT WARRANT EQUIPMENT NOT MANUFACTURED BY COMPANY. IF PERMITTED BY THE APPLICABLE MANUFACTURER, COMPANY SHALL PASS THROUGH SUCH MANUFACTURER'S WARRANTIES TO END-USER.

COMPANY DOES NOT WARRANT SOFTWARE, INCLUDING SOFTWARE EMBEDDED IN PRODUCTS, THAT IS NOT CREATED BY COMPANY. WITHOUT LIMITING THE FOREGOING, COMPANY SPECIFICALLY DOES NOT WARRANT SOFTWARE (SUCH AS LINUX) THAT WAS CREATED USING AN "OPEN SOURCE" MODEL OR IS DISTRIBUTED PURSUANT TO AN OPEN SOURCE LICENSE.

THIS WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY OFFERED BY COMPANY WITH RESPECT TO THE PRODUCTS AND SERVICES AND, EXCEPT FOR SUCH FOREGOING WARRANTY COMPANY DISCLAIMS ALL OTHER WARRANTIES INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY, TITLE, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE. CORRECTION OF NON-CONFORMITIES IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE SHALL CONSTITUTE COMPANY'S SOLE LIABILITY AND END-USER'S EXCLUSIVE REMEDY FOR FAILURE OF COMPANY TO MEET ITS WARRANTY OBLIGATIONS, WHETHER CLAIMS OF THE END-USER ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY), OR OTHERWISE.

LIMITATION OF LIABILITY: The remedies of the End-User set forth herein are exclusive and are the sole remedies for any failure of Company to comply with its obligations hereunder. In no event shall Company be liable in contract, in tort (including negligence or strict liability) or otherwise for damage to property or equipment other than the Products, including loss of profits or revenue, loss of use of Products, loss of data, cost of capital, claims of customers of the End-User or any special, indirect, incidental or consequential damages whatsoever. The total cumulative liability of Company hereunder whether the claims are based in contract (including indemnity), in tort (including negligence or strict liability) or otherwise, shall not exceed the price of the Product on which such liability is based.

Company shall not be responsible for failure to provide service or parts due to causes beyond Company's reasonable control.

END-USER'S OBLIGATIONS: In order to receive the benefits of this Warranty, the End-User must use the Product in a normal way; follow the Product's user's guide; and protect against further damage to the Product if there is a covered defect.

OTHER LIMITATIONS: Company's obligations under this Warranty are expressly conditioned upon receipt by Company of all payments due to it (including interest charges, if any). During such time as Company has not received payment of any amount due to it for the Product, in accordance with the contract terms under which the Product is sold, Company shall have no obligation under this Warranty. Also during such time, the period of this Warranty shall continue to run and the expiration of this Warranty shall not be extended upon payment of any overdue or unpaid amounts.

COSTS NOT RELATED TO WARRANTY: The End-User shall be invoiced for, and shall pay for, all services not expressly provided for by the terms of this Warranty, including without limitation, site calls involving an inspection that determines no corrective maintenance is required. Any costs for replacement equipment, installation, materials, freight charges, travel expenses or labor of Company representatives outside the terms of this Warranty will be borne by the End-User.

OBTAINING WARRANTY SERVICE: In the USA, call the Customer Reliability Center 7x24 at 800-356-5737. Outside of the USA, call your local Powerware product sales or service representative, or call the Customer Reliability Center in the USA at 919-870-3149. For comments or questions about this Warranty, write to the Customer Quality Representative, 3301 Spring Forest Road, Raleigh, North Carolina 27616 USA.

Ten-Year Pro-Rated Limited Warranty (US and Canada)

Powerware UPS Models: 5115, 5125, 5140, 9120, 9125, 9130, 9140, 9155, 9170+, and FERRUPS

WARRANTOR: The warrantor for the limited warranties set forth herein is Eaton Electrical Inc., a Delaware Corporation company ("Company").

LIMITED WARRANTY: This pro-rated limited warranty (this "Warranty") applies only to the original End-User (the "End-User") of any Powerware 5115, 5125, 5140, 9120, 9125, 9130, 9140, 9155, 9170+, and FERRUPS Products (individually and collectively, the "Product") and cannot be transferred. This Warranty applies even in the event that the Product is initially sold by Company for resale to an End-User.

WHAT THIS WARRANTY COVERS: In addition to the standard Two-Year Limited Warranty covering the applicable Product, the warrantor warrants that the Product will have a service life (defined below) of ten years from the date of purchase (the "Ten-Year Service Life") when used in accordance with the storage, handling, installation, operation and maintenance procedures prescribed in the Product's user's guide. "Service life" means the Product's ability to deliver at least 80% of its original rated backup time.

If Company finds, in its sole discretion, that any Product has not provided the Ten-Year Service Life, Company will, as its sole obligation and the End-User's sole remedy for Company's breach of this warranty, repair or replace the Product, at its option, F.O.B. Company's factory, for a charge, payable by the End-User to Company pro-rated on the following basis:

The End-User will be allowed a credit against Company's list price of equivalent equipment at the time of return of the Product to Company, in proportion to the percentage of Ten-Year Service Life remaining at the time of return of the Product to Company. In calculating the available credit, the remaining portion of the Ten-Year Service Life will be rounded up or down to the nearest whole year. The End-User will assume responsibility to pay the balance of the list price; and Company reserves the right to require payment prior to delivery of the repaired or replacement equipment.

For the avoidance of doubt, Company's responsibilities under this Warranty are as follows:

Years 1-2 - Product repaired or replaced pursuant to terms of Limited Warranty

Years 3-10 - Unit Credit ($) = Current List Price $\times$ $\frac{\text{Years of Unexpired Life}}{\text{10 Years of Warranted Life}}$

WHAT THIS LIMITED WARRANTY DOES NOT COVER: This Warranty does not cover any defects or damages caused by: (a) failure to properly store the Product before installation, including the charge of batteries no later than the date indicated on the packaging; (b) shipping and delivery of the Product if shipping is FOB Factory; (c) neglect, accident, abuse, misuse, misapplication, or incorrect installation; (d) repair or alteration not authorized in writing by Company personnel or performed by an authorized Company Customer Service Engineer or Agent; (e) improper testing, operation, maintenance, adjustment, or modification of any kind not authorized in writing by Company personnel or performed by an authorized Company Customer Service Engineer or Agent; or (f) use of the Product under other than normal operating conditions or in a manner inconsistent with the Product's labels or instructions.

This Warranty is not valid: (a) unless the End-User returns to Company the Warranty Registration Card within thirty (30) days of purchase; or (b) if the Product's serial numbers have been removed or are illegible. Any Warranted Items repaired or replaced pursuant to this Warranty will be warranted for the remaining portion of the original Warranty subject to all the terms thereof.

Company shall not be responsible for any charges for testing, checking, removal or installation of Warranted Items.

COMPANY DOES NOT WARRANT EQUIPMENT NOT MANUFACTURED BY COMPANY. IF PERMITTED BY THE APPLICABLE MANUFACTURER, COMPANY SHALL PASS THROUGH SUCH MANUFACTURER'S WARRANTIES TO END-USER.

COMPANY DOES NOT WARRANT SOFTWARE, INCLUDING SOFTWARE EMBEDDED IN PRODUCTS, THAT IS NOT CREATED BY COMPANY. WITHOUT LIMITING THE FOREGOING, COMPANY SPECIFICALLY DOES NOT WARRANT SOFTWARE (SUCH AS LINUX) THAT WAS CREATED USING AN "OPEN SOURCE" MODEL OR IS DISTRIBUTED PURSUANT TO AN OPEN SOURCE LICENSE.

THIS WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY OFFERED BY COMPANY WITH RESPECT TO THE PRODUCTS AND SERVICES AND, EXCEPT FOR SUCH FOREGOING WARRANTY COMPANY DISCLAIMS ALL OTHER WARRANTIES INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY, TITLE, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE. CORRECTION OF NON-CONFORMITIES IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE SHALL CONSTITUTE COMPANY'S SOLE LIABILITY AND END-USER'S EXCLUSIVE REMEDY FOR FAILURE OF COMPANY TO MEET ITS WARRANTY OBLIGATIONS, WHETHER CLAIMS OF THE END-USER ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY), OR OTHERWISE.

LIMITATION OF LIABILITY: The remedies of the End-User set forth herein are exclusive and are the sole remedies for any failure of Company to comply with its obligations hereunder. In no event shall Company be liable in contract, in tort (including negligence or strict liability) or otherwise for damage to property or equipment other than the Products, including loss of profits or revenue, loss of use of Products, loss of data, cost of capital, claims of customers of the End-User or any special, indirect, incidental or consequential damages whatsoever. The total cumulative liability of Company hereunder whether the claims are based in contract (including indemnity), in tort (including negligence or strict liability) or otherwise, shall not exceed the price of the Product on which such liability is based.

Company shall not be responsible for failure to provide service or parts due to causes beyond Company's reasonable control.

END-USER'S OBLIGATIONS: In order to receive the benefits of this Warranty, the End-User must use the Product in a normal way; follow the Product's operation and maintenance manual; and protect against further damage to the Product if there is a covered defect.

OTHER LIMITATIONS: Company's obligations under this Warranty are expressly conditioned upon receipt by Company of all payments due to it (including interest charges, if any). During such time as Company has not received payment of any amount due to it for the Product, in accordance with the contract terms under which the Product is sold, Company shall have no obligation under this Warranty. Also during such time, the period of this Warranty shall continue to run and the expiration of this Warranty shall not be extended upon payment of any overdue or unpaid amounts.

COSTS NOT RELATED TO WARRANTY: The End-User shall be invoiced for, and shall pay for, all services not expressly provided for by the terms of this Warranty, including without limitation, site calls involving an inspection that determines no corrective maintenance is required. Any costs for replacement equipment, installation, materials, freight charges, travel expenses or labor of Company representatives outside the terms of this Warranty will be borne by the End-User.

OBTAINING WARRANTY SERVICE: In the USA, call the Customer Reliability Center 7x24 at 800-356-5737. Outside of the USA, contact your local Powerware product sales or service representative, or call the Customer Reliability Center in the USA at 919-870-3149. Company will not accept any Product for return, credit or exchange unless expressly authorized by Company in writing and delivered FOB Company factory. For comments or questions about this Warranty, write to the Customer Quality Representative, 3301 Spring Forest Road, Raleigh, North Carolina 27616 USA.

Load Protection Guarantee (US and Canada)

Powerware UPS Models 3105, 5110, 5115, 5125, 9120, 9125, 9130, 9140, 9150, 9155, 9170+, and FERRUPS

GUARANTOR: The Guarantor for the load protection guaranty set forth herein is Eaton Electrical Inc., a Delaware Corporation company ("Company").

LIMITED GUARANTY: This load protection guaranty (this "Guaranty") applies only to the original End-User (the "End-User") of any Powerware 3105, 5110, 5115, 5125, 9120, 9125, 9130, 9140, 9150, 9155, 9170+, and FERRUPS Products (individually and collectively, the "Product") and cannot be transferred. This Guaranty applies even in the event that the Product is initially sold by Company for resale to an End-User.

WHAT THIS GUARANTY COVERS: For the lifetime of the Product, Guarantor promises to repair or replace, at Guarantor's option, the equipment (valued up to the limits shown below*) that is damaged by an AC power line surge, spike, or other transient when properly connected to Guarantor's uninterruptible power system ("UPS"). Reimbursement for or restoration of data loss excluded. This Guaranty applies only if all of the following circumstances arise:

1. The UPS is plugged into properly grounded and wired outlets, using no extension cords, adapters, other ground wires or other electrical connectors;
2. The installation of the UPS complies with all applicable electrical and safety codes described by the National Electrical Code (NEC);
3. The UPS was used under normal operating conditions and in accordance with all labels and instructions; and
4. The UPS was not damaged by accident (other than AC power line transient), misuse, or abuse.

*Cumulative Limits to be paid by Guarantor under this Load Protection Guaranty:

- $25,000 for Powerware UPS Model 3105
- $150,000 for Powerware UPS Models 5110, 5115, and 5125
- $250,000 for Powerware UPS Models 9120, 9125, 9130, 9140, 9150, 9155, 9170+, and FERRUPS products

Eaton 9130 UPS

700 – 3000 VA

Multilingual LCD

Advanced power protection for:

- IT and networking environments
- Servers, networking gear
- Telecommunications, VoIP, security systems
- Medical systems
- Diagnostics and medical screening
- Patient record archives
- Manufacturing systems
- Chip fabrication
- Pharmaceutical production
- Chemical processing

Double conversion UPS

Highest power performance

- Double conversion topology. The 9130 constantly monitors power conditions and regulates voltage and frequency. Even when presented with the most severe power problems, UPS's output remains within 3% of nominal voltage.
- More real power. High 0,9 output power factor enables the 9130 to provide its full power capability to modern IT equipment.
- Highest efficiency to reduce utility and cooling spending. When power conditions are within acceptable limits, the 9130 can operate in a high-efficiency mode providing 95 percent efficiency.

Unmatched reliability

- The internal bypass allows service continuity in case of internal fault, a maintenance bypass is also available (as option) for easy replacement of the UPS without powering down critical systems.
- Stronger, longer battery life. Eaton ABM® battery management technology uses an innovative three-stage charging technique, that only recharges the battery when necessary, so the battery experiences less corrosion and service life is prolonged by up to 50%.
- Batteries can be hot-swapped without ever having to shut down connected equipment.
- Possibility to add more runtime at any time with up to four external hot-swappable battery modules to run systems for hours if necessary.
- Enables prolonged runtime of essential equipment during power outages by allowing for orderly, remote shutdown of non-critical systems and processes thanks to a capability to control load segments.

Outstanding versatility

- One platform, two factors, dozens of choices. Up to 3000 VA of UPS power is packed into only 2U of rack space. The tower option is about the size of a modern, compact PC.
- Enhanced configuration capability through easily navigated multilingual graphical display.
- Remote monitoring. The 9130 comes complete with the Eaton Software Suite CD including SNMP-compatible power management software providing control and visibility over all your UPS systems.
- Connectivity options are available for almost any network environment.

EATON

Powering Business Worldwide

Eaton 9130 UPS

1. Multilingual graphical LCD display
2. Panel for replacing batteries
3. 1 USB port + 1 serial port
4. 1 Relay Output + 1 EPO connector
5. EBM battery unit connector
6. Load segments
7. Communication card slot

TECHNICAL SPECIFICATIONS

General	
User interface	Graphical LCD with blue backlight and text in English, French, German, Russian and Spanish
LEDs	Four status-indicating LEDs
Topology	True online, double-conversion
Diagnostics	Full system self-test
UPS bypass	Automatic bypass
Rail kit	Included with all rackmount units
Electrical Input	
Nominal voltage	220–240V
Voltage range	160–276 Vac (with load PF of 0.7)
Frequency range	45–65 Hz (50/60 Hz)
Electrical Output	
Power factor	0.9
Voltage	±3 % of nominal regulation (on utility and battery)
Frequency regulation	±3 Hz online
Load crest factor	3 to 1

Communications	
Ports	RS-232 and USB HID port as standard
Relay output	Common alarm standard
Optional communication cards (BD Slot)	SNMP/Web card for monitoring in SNMP-based networks, monitoring through Web browser interface. Relay card for integration to industrial environment and BMS, remote shutdown for IBM AS/400 systems
Environmental	
Safety and EMC markings	CE (per IEC/EN62040-2: Emissions, Category C1; Immunity, Category C2), GS
Audible noise	<50 dB
Ambient operating	0˚C to +40˚C
Storage temperature	-20˚C to +40˚C with batteries and -25˚C to +55˚C without batteries
Relative humidity	5–90% non-condensing

Catalog number	Style number	Rating (VA/Watts)	Input connection	Output receptacles	Dimensions H x W x D, mm	Weight, kg
Tower Models						
PW9130i700T	103006433-6591	700/630	C14	(6) C13	230 x 160 x 350	12.2
PW9130i1000T-XL	103006434-6591	1000/900	C14	(6) C13	230 x 160 x 380	14.5
PW9130i1500T-XL	103006435-6591	1500/1350	C14	(6) C13	230 x 160 x 430	19.0
PW9130i2000T-XL	103006436-6591	2000/1800	C14	(8) C13, (1) C19	325 x 214 x 410	34.5
PW9130i3000T-XL	103006437-6591	3000/2700	C20	(8) C13, (1) C19	325 x 214 x 410	34.5
Tower Extended Battery Modules						
PW9130N1000T-EBM	103006438-6591	NA	NA	NA	230 x 160 x 380	18.5
PW9130N1500T-EBM	103006439-6591	NA	NA	NA	230 x 160 x 430	24.3
PW9130N3000T-EBM	103006440-6591	NA	NA	NA	325 x 214 x 410	50.0
Rack Models						
PW9130i1000R-XL2U	103006455-6591	1000/900	C14	(6) C13	86.5 x 438 x 450	16
PW9130i1500R-XL2U	103006456-6591	1500/1350	C14	(6) C13	86.5 x 438 x 450	19
PW9130i2000R-XL2U	103006457-6591	2000/1800	C14	(8) C13, (1) C19	86.5 x 438 x 600	29
PW9130i3000R-XL2U	103006463-6591	3000/2700	C20	(8) C13, (1) C19	86.5 x 438 x 600	29.5
Rack Extended Battery Modules						
PW9130N1000R-EBM2U	103006458-6591	NA	NA	NA	86.5 x 438 x 450	22.1
PW9130N1500R-EBM2U	103006459-6591	NA	NA	NA	86.5 x 438 x 450	28.1
PW9130N3000R-EBM2U	103006460-6591	NA	NA	NA	86.5 x 438 x 600	41.1

	Internal batteries		+1 EBM		+2 EBMs		+3 EBMs		+4 EBMs	
BATTERY RUNTIMES*	75% Load	50% Load	75% Load	50% Load	75% Load	50% Load	75% Load	50% Load	75% Load	50% Load
Rack models										
PW9130i1000R-XL2U	13	22	55	82	103	186	151	250	223	312
PW9130i1500R-XL2U	11	18	47	81	83	143	126	208	195	262
PW9130i2000R-XL2U	13	24	63	95	118	190	170	242	221	345
PW9130i3000R-XL2U	8	14	34	62	70	92	96	156	130	211
Tower models										
PW9130i700T-XL	12	19	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PW9130i1000T-XL	13	22	55	82	103	186	151	250	223	312
PW9130i1500T-XL	11	18	47	81	83	143	126	208	195	262
PW9130i2000T-XL	21	34	81	130	145	198	184	293	248	431
PW9130i3000T-XL	12	20	49	79	90	143	134	180	165	240

* Runtimes are shown at a 0.7 power factor. Backup times are approximate and may vary with equipment, configuration, battery age, temperature, etc.

© 2008 Eaton Corporation, All Rights Reserved, Printed in Finland, 00DATA1018094 rev A, February 2009
In the interests of continual product improvement all specifications are subject to change without notice.

Eaton 9130

Technical specification

author: Mark Tang, Phoenixtec
Checker: Philippe Meunier-Carus, DPQ BU

doc. number: 10 28 846
revision: A0
doc. date: 2008-12-19

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

EATON CORPORATION - CONFIDENTIAL AND PROPRIETARY

NOTICE TO PERSONS RECEIVING THIS DOCUMENT
AND/OR TECHNICAL INFORMATION

THIS DOCUMENT, INCLUDING THE DRAWING AND INFORMATION CONTAINED THEREON, IS CONFIDENTIAL AND IS THE EXCLUSIVE PROPERTY OF EATON CORPORATION, AND IS MERELY ON LOAN AND SUBJECT TO RECALL BY EATON AT ANY TIME. BY TAKING POSSESSION OF THIS DOCUMENT, THE RECIPIENT ACKNOWLEDGES AND AGREES THAT THIS DOCUMENT CANNOT BE USED IN ANY MANNER ADVERSE TO THE INTERESTS OF EATON, AND THAT NO PORTION OF THIS DOCUMENT MAY BE COPIED OR OTHERWISE REPRODUCED WITHOUT THE PRIOR WRITTEN CONSENT OF EATON. IN THE CASE OF CONFLICTING CONTRACTUAL PROVISIONS, THIS NOTICE SHALL GOVERN THE STATUS OF THIS DOCUMENT.

© 2008 Eaton Corporation – All Rights Reserved.

Content

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

1 Revision history

Rev	Description	Date	Author
A0	First issue	2008-12-19	PMC

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

2 Introduction

This document defines the technical specification of EATON 9130 range, 700VA to 3000VA on line UPS, High/Low Voltage, listed in the table hereafter.

LV (Low voltage) indicate 120V nominal voltage (L models)

HV (High voltage) indicate 208/230/240V nominal voltage (G / G-EU / i / G-AU models)

9130 Tower model

9130 Rack model

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

2.1 Rack models

Catalog Number	Style Number	Description	Rating (VA/W)
North American Rack 120V, 50/60 Hz : L model			
PW9130L700R-XL2U	103006447-6591	PW9130 700 120V RACK	700/630
PW9130L1000R-XL2U	103006448-6591	PW9130 1000 120V RACK	1000/900
PW9130L1500R-XL2U	103006449-6591	PW9130 1500 120V RACK	1500/1350
PW9130L2000R-XL2U	103006450-6591	PW9130 2000 120V RACK	2000/1800
PW9130L2500R-XL2U	103006451-6591	PW9130 2500 120V RACK	2500/2250
PW9130L3000R-XL2U	103006452-6591	PW9130 3000 120V RACK	3000/2700
Global Rack 208V, 50/60 Hz : G / G-EU model			
PW9130G1000R-XL2U	103006461-6591	PW9130 1000G RACK	1000/900
PW9130G2000R-XL2U	103006462-6591	PW9130 2000G RACK	2000/1800
PW9130G2500R-XL2U	103006453-6591	PW9130 2500G RACK	2500/2250
PW9130G3000R-XL2U	103006454-6591	PW9130 3000G RACK	3000/2700
PW9130G1000R-XL2UEU	103006480-6591	PW9130 1000G EU RACK	1000/900
PW9130G2000R-XL2UEU	103006481-6591	PW9130 2000G EU RACK	2000/1800
PW9130G2500R-XL2UEU	103006482-6591	PW9130 2500G EU RACK	2500/2250
PW9130G3000R-XL2UEU	103006483-6591	PW9130 3000G EU RACK	3000/2700
International Rack 230V, 50/60 Hz : i model			
PW9130i1000R-XL2U	103006455-6591	PW9130 1000 230V RACK	1000/900
PW9130i1500R-XL2U	103006456-6591	PW9130 1500 230V RACK	1500/1350
PW9130i2000R-XL2U	103006457-6591	PW9130 2000 230V RACK	2000/1800
PW9130i3000R-XL2U	103006463-6591	PW9130 3000 230V RACK	3000/2700
9130 Australian 240V, 50/60 Hz : G-AU model			
PW9130G1000R-XL2UAU	103006464-6591	PW9130 1000G AUS RACK	1000/900
PW9130G1500R-XL2UAU	103006465-6591	PW9130 1500G AUS RACK	1500/1350
PW9130G2000R-XL2UAU	103006466-6591	PW9130 2000G AUS RACK	2000/1800
PW9130G3000R-XL2UAU	103006467-6591	PW9130 3000G AUS RACK	3000/2700
Rack Extended Battery Modules			
PW9130N1000R-EBM2U	103006458-6591	PW9130 700/1000 EBM RACK	NA
PW9130N1500R-EBM2U	103006459-6591	PW9130 1500 EBM RACK	NA
PW9130N3000R-EBM2U	103006460-6591	PW9130 2000/3000 EBM RACK	NA

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

2.2 Tower models

Catalog Number	Style Number	Description	Rating (VA/W)
North American Tower 120V, 50/60 Hz : L model			
PW9130L700T-XL	103006426-6591	PW9130 700 120V TOWER	700/630
PW9130L1000T-XL	103006427-6591	PW9130 1000 120V TOWER	1000/900
PW9130L1500T-XL	103006428-6591	PW9130 1500 120V TOWER	1500/1350
PW9130L2000T-XL	103006429-6591	PW9130 2000 120V TOWER	2000/1800
PW9130L3000T-XL	103006430-6591	PW9130 3000 120V TOWER	3000/2700
Global Tower 208V, 50/60 Hz : G / G-EU model			
PW9130G1000T-XL	103006431-6591	PW9130 1000G TOWER	1000/900
PW9130G2000T-XL	103006432-6591	PW9130 2000G TOWER	2000/1800
PW9130G3000T-XL	103006446-6591	PW9130 3000G TOWER	3000/2700
PW9130G1000T-XLEU	103006477-6591	PW9130 1000G EU TOWER	1000/900
PW9130G2000T-XLEU	103006478-6591	PW9130 2000G EU TOWER	2000/1800
PW9130G3000T-XLEU	103006479-6591	PW9130 3000G EU TOWER	3000/2700
International Tower 230V, 50/60 Hz : i model			
PW9130i700T-XL	103006433-6591	PW9130 700 230V TOWER	700/630
PW9130i1000T-XL	103006434-6591	PW9130 1000 230V TOWER	1000/900
PW9130i1500T-XL	103006435-6591	PW9130 1500 230V TOWER	1500/1350
PW9130i2000T-XL	103006436-6591	PW9130 2000 230V TOWER	2000/1800
PW9130i3000T-XL	103006437-6591	PW9130 3000 230V TOWER	3000/2700
Australian Tower 240V, 50/60 Hz: G-AU model			
PW9130G700T-XLAU	103006441-6591	PW9130 700G AUS TOWER	700/630
PW9130G1000T-XLAU	103006442-6591	PW9130 1000G AUS TOWER	1000/900
PW9130G1500T-XLAU	103006443-6591	PW9130 1500G AUS TOWER	1500/1350
PW9130G2000T-XLAU	103006444-6591	PW9130 2000G AUS TOWER	2000/1800
PW9130G3000T-XLAU	103006445-6591	PW9130 3000G AUS TOWER	3000/2700
Tower Extended Battery Modules			
PW9130N1000T-EBM	103006438-6591	PW9130 1000 EBM TOWER	NA
PW9130N1500T-EBM	103006439-6591	PW9130 1500 EBM TOWER	NA
PW9130N3000T-EBM	103006440-6591	PW9130 2000/3000 EBM TOWER	NA

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

3 Scope & Modes of Operation

3.1 Scope

This specification covers the requirements & quality assurance provisions for AC line powered Uninterruptible power supplies for PW9130 Tower and Rack units.

The UPS utilize On-Line (High Frequency Double Conversion) UPS topology. The UPS consists of a battery charger, Power factor corrector, battery, inverter, transfer switches and all associated controls, monitoring and major protection devices. The term “UPS” denote the hardware and firmware associated to provide high quality AC power for sensitive electronic and other critical loads.

The UPS automatically maintains continuity of electrical power within tolerances and time frames specified in this product specification.

This specification covers the PW9130 Tower and Rack units from 700VA to 3000VA.

3.2 Modes of Operation

In normal operation (other than during UPS fault or Bypass conditions) the output is always a regulated, transient-free sinewave produced by the high frequency inverter within the UPS. During UPS Fault or Bypass (overload) conditions the output will automatically be switched to bypass with no break in power and then automatically return from bypass after the problem has been cleared with no break in power.

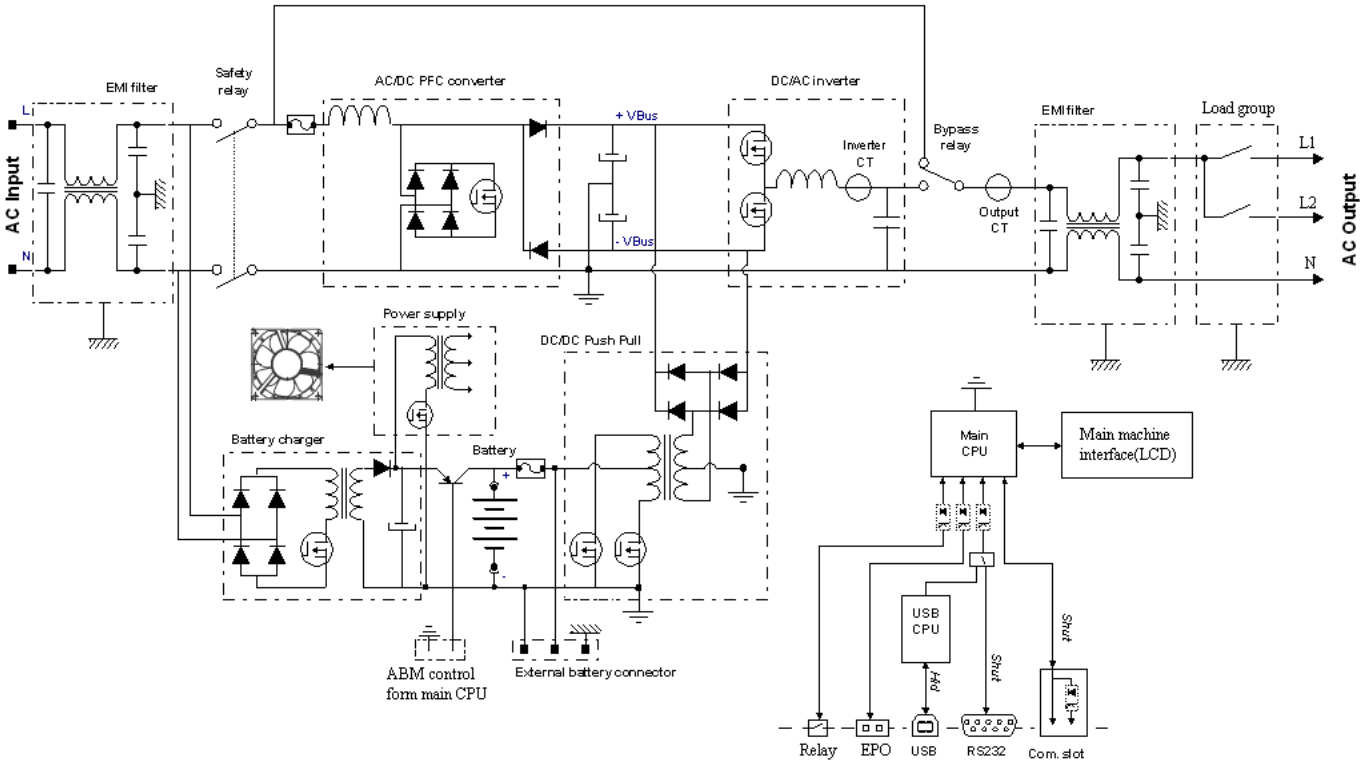
The battery can be charged from the utility irrespective of whether the UPS are ON or OFF.

The end-user shall be able to have the UPS operate in a High Efficiency Mode. While operating in High Efficiency mode the unit will transfer back to on-line mode when (1) input voltage is outside +/-10% from nominal or (2) input frequency is greater than +/-5 hertz. (3) Input line is not available. If a transfer is required, it will not be more than 5 ms. The input voltage window should be selectable by the customer at +/-10 % (default) or +/-15%.

For more detailed mode of operation, please refer to the 9130 UPS behavior document reference 10 27 331

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

3.3 Block diagram



This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

3.4 Regulatory Standards

	L Model	G/G-EU Model	i Model	G-AU Model
Safety Standards	UL1778, CSA C22.2 no.107.3		IEC 62040-1-1, IEC 60950-1	
Certificates	cULus (UL, cUL), NOM, CE		CB, CE, GS mark, Gost	CE, cTick
Report	cULus report	CB to 62040-1-1 & 60950-1 with all country deviations		
EMI / EMC	FCC Class B VCCI Class B (2 kVA and below) FCC Class A VCCI Class A (above 2kVA)	FCC Class B VCCI Class B IEC 62040-2 : Emissions: C1 (class B) Immunity: C2 (see below)	IEC 62040-2 Emissions: Category C1 (class B) Immunity: Category C2 (see below)	
Input Harmonics and flicker	NA	IEC 61000-3-2 / IEC 61000-3-3		
Immunity	Surge ANSI C62.41 Cat B3 (6 KV Ring and Combination)	EN61000-2-2, EN61000-4-2, Level 3 (air), level 2 (contact) EN61000-4-3, Level 3 EN610000-4-4, Level 3 (power line), 4 (signal ports) EN61000-4-5, Level 3 (L-N), Level 4 (L-PE/N-PE) EN61000-4-6, Level 3 (10V) EN61000-4-8, Level 4 (30A/m) EN61000-4-11 Surge ANSI C62.41 Cat B3 (6 KV Ring and Combination) for G model only		
Vibration / Drop test	Packing material comply with ISTA project 2			

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

4 Electrical performance

4.1 Input

	LV Models	HV models
Acceptable Input Voltage Range	**700-1.5KVA** 60 / 70 / 80Vac to 138 Vac (PF 0.7) [1)] 90Vac to 138 Vac (PF 0.8) 100Vac to 138 Vac (PF 0.9) **2-3kVA** 70 / 80 / 90Vac to 138 Vac (PF 0.7) [1)] 95Vac - 138 Vac (PF 0.8) 100Vac – 138 Vac (PF 0.9)	**700-1.5KVA:** 120 / 140 / 160Vac to 276 Vac (PF 0.7) [1)] 180Vac to 276 VAC (PF 0.8) 190Vac to 276 VAC (PF 0.9) **for 2-3KVA:** 140 / 160 / 180Vac to 276 Vac (PF 0.7) [1)] 190Vac to 276 Vac (PF 0.8) 200Vac to 276 Vac (PF 0.9)
Rated input current	**700VA** = 5.8A | **1kVA** = 9.0A **1.5kVA** = 12A | **2kVA** = 16.7A **2.5kVA** = 20.8A | **3kVA** = 25A	**700VA** = -/ 3 / 2.9A | **1kVA** = 4.9 /4.3/4.2A **1.5kVA** = **-**/ 7.2 / 6.5A | **2kVA** = 9.6/ 8.7/ 8.3A **2.5kVA** = 12A /-/- | **3kVA** = 14.4 / 13 / 12.5A *(208/230/240V)*
Acceptable Bypass Voltage Range	+10/-15% of nominal voltage (default value) high and low limits up to +20/-20% (user selectable)	
Acceptable input frequency range	40 – 70 Hz [2)]	
Frequency Synchronization range	+/- 3Hz (by default) [2)], can be configured by user to disabled, +/-0.5Hz, +/-1Hz, +/-2Hz	
Cold Start (0 to 100% load) [3)]	If battery voltage > 1.85Vpc, default = 60 Hz	If battery voltage > 1.85Vpc, default = 50 Hz
Earth leakage current	1.5 mA max (UPS only)	
Inrush current	45 A (pk) at initial startup, decaying exponentially within 30 ms	
Input protection	Protection derived from the branch rated utility system circuit breaker as allowed by safety agency standard	
Site wiring fault	Enabled by default for L and i models, disabled by default for G models	
Surge protection [4)]	MOV ratings : 271Volt (from L-N) and 510 Volt (from L-G and N-G) 190 Joules.	MOV ratings : 510 Volt, 296 Joules. .
Input power factor	> 0.99	
THDI	IEC 61000-3-2 / IEC 61000-3-3. THDI <= 8% @ nominal input voltage, battery fully charged, NTH<=40	

[1)] at 33 / 66 / 100 % load, with corresponding Power factor (PF)

[2)] During the time the UPS is between the maximum input frequency limits (40Hz to 70Hz) and outside the selected frequency tolerance (+/-3Hz factory configured) the unit is in the Free Run Mode where the bypass mode is disabled and the output frequency is regulated at +/-0.25Hz (same as battery mode). During the Free Run Mode, the customer should be able to select if the bypass can be available with the potential of a break during transfer of less than 10msec. If synch disabled, the UPS will synchronize only when operating on bypass.

[3)] The utility must be present at first startup to enable the cold start function. It can be disabled by user setting.

[4)] MOV's from L, N to ground have a gas tube as isolation between the MOV and ground (required to meet European requirements where you need a measurable air gap or/and Y capacitor). An acceptable air gap per EN60950 is (1) 2.5mm for surface creapage between bands and (2) 2.0mm through air. The MOVs have thermal fuse to satisfy the requirements of UL1449. In addition, they are wired for an audible alarm to sound and indicate a failed MOV. Note: Gas discharge devices do not use radioactive material

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

4.2 Output

	L Model	G/G-EU Model	i Model	G-AU Model
Power (VA) max.	700 / 1000 / 1500 / 2000 / 2500 / 3000 (1)			
Power (Watts) max.	630 / 900 / 1350 / 1800 / 2250 / 2700			
Load Power Factor Range	0.7 lagging to 1.0 (unity)			
Output Voltage				
▪ Waveform	Sinusoidal			
▪ Nominal Voltage	120V	208V (3),	230V	240V
▪ Other output voltages selectable via the LCD display	100V, 110V (2), 127V, autosensing	208 (3), 220 , 240, autosensing		
▪ Steady State Voltage Regulation	±2% from no-load to full-load, battery fully charged			
▪ Battery Mode Voltage Regulation	±3% RMS for entire battery voltage range and 0 to 100% load			
▪ Slew rate	1Hz/s			
▪ Transient Response (line mode with R type load)	20% - 100% - 20%; ± 6 % max.			
▪ Transient Response (battery mode with R type load)	0% - 100% - 0%; ± 15 % max. 20% - 100% - 20%; ± 9 % max.			
▪ Transient Recovery (R Load)	To nominal voltage within 30 ms			
▪ Output voltage on bypass mode	Same as input acceptable voltage range			
Output Frequency Range				
▪ Line Mode	Autosensing, with output phase locked to input frequency (4)			
▪ Battery Mode/Free Run Mode	50Hz or 60Hz ± 0.25 Hz			
▪ Bypass mode	50Hz or 60Hz ± 5Hz			
Output Voltage Distortion				
▪ R Load	< 3 % THD (<4% at low battery voltage(11Vdc/battery))			
▪ SMPS Load	< 5 % THD (<7% at low battery voltage (11Vdc/battery))			
Efficiency on line mode (AC to AC) Full PFC load	86% (700VA) 87% (1kVA) 86% (1.5kVA) 88% (2kVA R) 90% (3KVA R) 88% (2kVA T) 89% (3KVA T)	87% (700VA) 88% (1kVA) 90% (1.5kVA) 90% (2kVA R) 91% (3KVA R) 90% (2kVA T) 91% (3KVA T)		
High Efficiency Mode Efficiency	> 93 %	> 94%		
Crest Factor	3:1			

(1) For LV rack model, 700VA is based on 1000VA de rating, 2500VA is based on a 3000VA de rating

(2) 20% power de rating for 100V output voltage setting and 10% power de rating for 110V output voltage setting to meet UL current requirements.

(3) 20% power de rating for 200V output voltage setting and 10% power de rating for 208V output voltage setting

(4) Autosensing at unit startup on mains : if input < 55Hz, output = 50Hz, if input > = 55Hz, output = 60Hz. The unit goes to free run mode if input frequency is outside input frequency synchronization windows defined in input section

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

	L Model	G/G-EU Model	i Model	G-AU Model
Short Circuit Protection	Electronic Overload and short circuit, current limitation for 5 cycle			
Overload Capability (on-line)				
▪ 100%< Load <102%	Overload warning			
▪ 102%<Load<130% of 12s	Overload warning then transfer to Bypass. Auto-retransfer when load returns to nominal.			
▪ 130%<Load<150% of 2s				
▪ 150%<Load immediately				
Overload Capability (on-battery)				
▪ 130% Load for 12 seconds	Overload warning			
▪ >130% of 2 seconds	Overload warning			
Overload Capability (on-bypass))				
▪ 100%< Load <110%	Overload warning			
▪ 110%<Load<130%	Shutdown after 5mn			
▪ 130%<Load<150%	Shutdown after 15s			
▪ 150%<Load	Shutdown after 300ms			
Transfer to bypass				
▪ Transfer condition	Transfer allowed by default if input voltage = +10/-15% of nominal voltage and frequency = 50Hz or 60Hz ± 5Hz Transfer can be disabled by user setting			
▪ Minimum time on bypass	5s			
▪ On-line Transfer Time – Inverter to Bypass and Bypass to Inverter	< 4 ms			
▪ High Efficiency Transfer Time – Inverter to Bypass and Bypass to Inverter	< 10ms			

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

4.3 Batteries (parameters are defined at 25 degree C)

	L Model	G/G-EU Model	i Model	G-AU Model
Type / Rating	12 V / 9.0 Ah Valve Regulated Lead Acid (VRLA) batteries			
Life time	Standard life (3-5 years)			
Back-up Time	See backup time table in next section			
Battery Bus Voltage (VDC) & (Number of Batteries per UPS)	**Tower model:** 700VA = 24V (2); 1000VA = 36V (3); 1500VA = 48V (4); 2000VA & 3000VA = 96V (8) **Rack model:** 700VA & 1000VA = 36V (3); 1500VA = 48V (4); 2000VA & 3000VA = 72V (6)			
External battery cabinet (EBM)	Up to 4 EBM can be connected (except on 700VA tower) Each external battery cabinet have two (2) strings of batteries 12V / 9Ah, number of batteries per string is according to above battery Bus voltage See backup time table in next section			
Battery Protection	Fuse			
Pre-alarm Level	2 minutes			
Battery Level Shutdown (Vcutoff)	1.67 Vpc, ± 3% of battery voltage at full load with level automatically raised for lighter loading following below formula *VCuttoff = (188*6-(74* LoadPercent *RatedWatt/(8000*Battotal)))/100, with Vcuttoff mini = 1.6Vpc* Battotal: the total number of battery			
Overcharge Protection	See ABM charging algorithm.			
Temperature Compensated Charger	See ABM charging algorithm.			
Voltage Level	See ABM charging algorithm.			
Max recharge current	1.4A (0.7~1.5kVA), 1.7A (2/3kVA)			
Recharge time	Internal battery: 3 hours to 90% 1 EBM: 9 hours to 90% 2 EBM: 15 hours to 90% 3 EBM: 21 hours to 90% 4 EBM: 27 hours to 90%			
Battery Leakage	100 μA maximum			
Battery Test	Automatic and manual (remote)			
Replaceable Batteries	Easy replacement			
Battery disconnected for transportation	Yes			

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

4.4 Charging process

The battery charging method or scheme can be selected between ABM [TM] (Advanced Battery Management) cycling and constant charging by a user setting. The operation in constant charging mode is very similar to ABM cycling when the same firmware algorithm can be used for the both charging schemes.

This description applies with both charging methods unless noticed otherwise: ABM = the following is only for ABM cycling mode, CC = this is only for constant charging mode.

4.4.1 Initiating charging cycle

The new battery charging cycle is initiated (charge mode is started) by any one of the following conditions:

- After every logic power up followed with startup of the unit..
- When cumulative time of on battery operation exceeds 20 seconds.
- ABM: If the open cell voltage (OCV) decreases below 2.10VPC (Volts per Cell) during rest mode, CC: N/A (no rest mode)
- ABM: After 28 days in rest mode period, CC: after t_{float} + 28 days in float mode
- After the manual battery support test

4.4.2 Charging cycle modes

The charging cycle consists of the following three phases described below in conjunction with the discharge mode:

1) **Charge mode** (constant current mode)
   - Battery charger voltage reference $U_{chargeRef}$ (25°C) = 2.38VPC.
   - Continued until the voltage reaches end level $U_{chargeEnd}$ (25°C) = 2.33VPC => to float mode
   - The duration of charge mode (t_{charge}) is measured and stored into UPS internal variable. This data is used to determine a length of the float mode
   - XCP Battery Block ABM status `Code is 1 (CHARGE_MODE)`, and battery status on the display is “Battery charging”.
   - Float mode is started if the measured battery voltage has not reached $U_{chargeEnd}$ within $t_{chargeMax}$. ”Charge failure” alarm (XCP alarm number 34) is generated at the same time if the voltage is below 2.25VPC.

     $t_{chargeMax}$ = 24h x Number of battery strings

2) **Float mode** (constant voltage mode)
   - Battery charger voltage reference $U_{floatRef}$ (25°C) = ABM: 2.31VPC, CC: 2.27VPC for a time of t_{float}.
     t_{float} = 1.5 x t_{charge} + 48 hours
   - XCP Battery Block ABM status `Code is 3 (FLOAT_MODE)`, and battery status on the display is “Battery floating”.

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

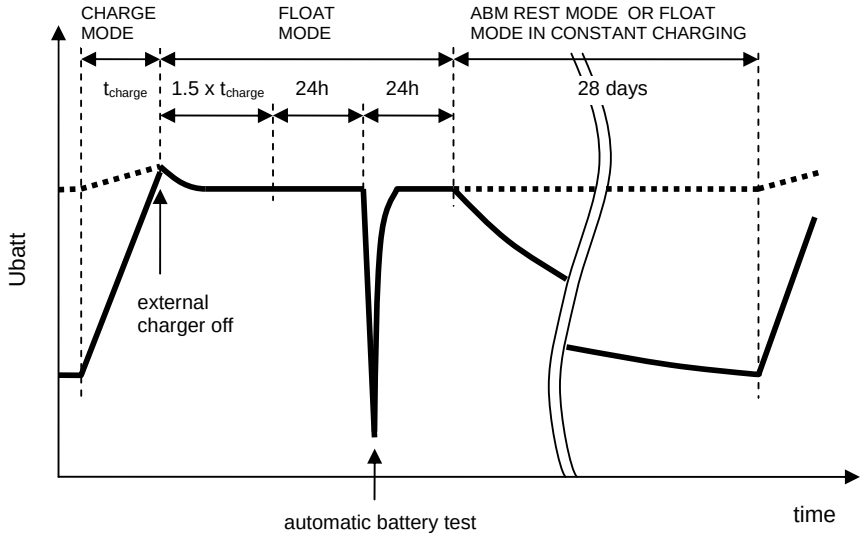
3) **Rest mode**

- ABM: After the float mode, the battery charger is turned off
- CC: Rest mode is disabled in constant charging mode when the float mode is continued for the next 28 days or until the UPS has had a accumulated 20 seconds of on battery operation or the UPS power cycled.
- The Rest Mode duration is 28 days or until the UPS has had a accumulated 20 seconds of on battery operation or the UPS power cycled.
- XCP Battery Block ABM status `Code is 4 (REST_MODE)`, and battery status on the display is “Battery resting”.
- ”Battery Test Failed (open cell voltage)” alarm (XCP alarm number 191) is generated if the Open Cell Voltage (OCV) decreases below 2.10VPC within the first 10 days in rest mode.
- Battery voltage level is not monitored during the first 3 minutes in rest mode (allowing time for the battery voltage to recover after short line breaks when a new charging cycle is not initiated. Helps prevent false OCV failures).

4) **Discharge mode**

- XCP Battery Block ABM status `Code is 2 (DISCHARGE_MODE)`, and battery status on the display is “Battery discharging”.
- ”Battery Low” alarm (XCP alarm number 56) is activated when the battery voltage decreases below the user defined limit.
- ”Low Battery Shutdown” alarm (XCP alarm number 174) is generated and the output of the unit is turned off when the battery voltage reaches the battery under voltage shut off level (see “battery low” section for details).

A typical charging cycle at 25°C is presented in the following picture.



Note. Minimum time on battery operation state should not be more than 4 s so that “UPS on battery” notice (delayed by 5 s by default) is not activated due to a short utility transient. On the other hand the unit should stay on battery mode until the utility has been acceptable for the return to line mode for at least 2 s.

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

4.5 Temperature compensation

Battery temperature variation is compensated by modifying battery charging voltage accordingly. In ABM charge and float modes, and when ABM charging cycles are disabled, the charger voltage reference is adjusted according to the battery temperature measurement, or the measurement that correlate to real internal battery cover temperature. The adjusted values are

- Battery charger voltage reference in charge mode ($U_{chargeRef}$) and the level where charge mode changes to float mode ($U_{chargeEnd}$)
- ABM cycling float mode voltage ($U_{floatRef}$)
- Charging voltage in the constant float mode ($U_{constRef}$)

The compensation temperature range is from 0°C to 50°C where the voltage per cell is decreased 3 mV per each °C. The charger values uses the following algorithm:

$$value(T) = default - 3mV \times (T - 25°C)$$

where *T* is the battery temperature, and
default mean the voltage levels at 25°C.

Under 0°C, *value*(0°C) is used. Above 50°C, *value*(50°C) is used.

The compensated voltage values at some temperatures are:

Value	**Charging voltage volts per cell**			
	10 °C	**25 °C**	**40 °C**	**50 °C**
$U_{chargeRef}$	2.425VPC	**2.38VPC**	2.335VPC	2.305VPC
$U_{chargeEnd}$	2.375VPC	**2.33VPC**	2.285VPC	2.255VPC
$U_{floatRef}$	2.355VPC	**2.31VPC**	2.265VPC	2.235VPC
$U_{constRef}$	2.315VPC	**2.27VPC**	2.225VPC	2.195VPC

If the temperature compensation is disabled by a user setting (see settings description for details) or when the battery temperature measurement is not available, the 25°C default values are assumed.

4.6 Battery overvoltage

Battery overvoltage alarm level is adaptive on the basis of charge mode end voltage as follows:

$$BatOVlim = U_{chargeEnd} + 0.05VPC$$

If the battery voltage exceed the limit for 15 s, “Battery DC over voltage” (alarm #69) is generated, charging is interrupted and the batteries are kept in rest mode until the unit is cold started. In case of utility break, the unit transfers normally to battery state.

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

4.7 Backup time table

4.7.1 Tower models

Load (VA/Watts)	Load (VA/Watts)	Internal Batteries	w/1 EBM	w/2 EBM	w/3 EBM	w/4 EBM
700VA LV Tower	700/630	**5.4**	N/A	N/A	N/A	N/A
	525/473	**8.1**	N/A	N/A	N/A	N/A
	350/315	**14.8**	N/A	N/A	N/A	N/A
	175/158	**32.7**	N/A	N/A	N/A	N/A
700VA HV Tower	700/630	**5.2**	N/A	N/A	N/A	N/A
	525/473	**7.9**	N/A	N/A	N/A	N/A
	350/315	**14.1**	N/A	N/A	N/A	N/A
	175/158	**31.4**	N/A	N/A	N/A	N/A
1000VA LV Tower	1000/900	**6.2**	32.0	55.0	83.6	108.7
	750/675	**9.7**	43.5	81.5	115.1	160.8
	500/450	**18.9**	69.3	111.3	191.4	257.7
	250/225	**31.8**	130.4	273.7	363.9	498.0
1000VA HV Tower	1000/900	**6.1**	31.5	51.4	82.0	100.3
	750/675	**9.2**	42.9	80.2	108.1	158.3
	500/450	**19.1**	68.2	110.8	192.6	246.2
	250/225	**30.5**	123.6	271.5	368.0	482.7
1500VA LV Tower	1500/1350	**5.5**	23.2	47.5	71.4	91.8
	1125/1013	**8.1**	33.6	71.7	96.6	130.0
	750/675	**14.0**	63.8	113.0	167.5	223.6
	375/338	**31.0**	121.0	233.5	334.7	367.3
1500VA HV Tower	1500/1350	**5.5**	24.6	46.0	69.0	89.8
	1125/1013	**7.7**	32.1	68.6	95.9	126.3
	750/675	**14.2**	61.6	111.8	172.2	221.5
	375/338	**29.4**	115.0	218.5	335.5	374.0
2000VA LV Tower	2000/1800	**10.7**	42.1	75.9	110.9	148.8
	1500/1350	**15.8**	63.1	115.6	158.4	213.1
	1000/900	**25.7**	99.4	168.6	243.2	343.6
	500/450	**54.8**	168.5	333.2	485.8	625.0
2000VA HV Tower	2000/1800	**11.2**	44.3	79.0	115.0	161.8
	1500/1350	**17.0**	60.0	112.0	164.0	203.0
	1000/900	**27.9**	95.8	168.0	258.0	336.0
	500/450	**54.9**	169.0	336.0	490.0	608.0
3000VA LV Tower	3000/2700	**6.1**	21.5	50.6	63.6	90.5
	2250/2025	**9.0**	39.0	68.7	105.0	120.0
	1500/1350	**16.1**	63.3	105.0	162.4	218.5
	750/675	**39.0**	138.8	231.5	320.2	440.6
3000VA HV Tower	3000/2700	**6.4**	21.3	51.5	66.0	93.5
	2250/2025	**8.6**	37.6	67.0	101.8	128.0
	1500/1350	**15.6**	60.0	100.0	169.0	215.0
	750/675	**40.0**	139.0	226.0	311.0	444.0

All backup time in minute

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

4.7.2 Rack models

Model	Load (VA/Watts)	Internal Batteries	w/1 EBM	w/2 EBM	w/3 EBM	w/4 EBM
700VA LV Rack	700/630	**10.5**	42.4	76.9	113.1	161.4
	525/473	**16.1**	60.8	108.3	170.1	210.6
	350/315	**29.2**	105.8	167.0	247.9	325.3
	175/158	**51.8**	207.0	344.4	479.5	548.4
1000VA LV Rack	1000/900	**6.2**	32.0	55.0	83.6	108.7
	750/675	**9.7**	43.5	81.45	115.1	160.8
	500/450	**18.9**	69.3	111.3	191.4	257.7
	250/225	**31.8**	130.4	273.7	363.9	498.0
1000VA HV Rack	1000/900	**6.1**	31.5	51.4	82.0	100.3
	750/675	**9.2**	42.9	80.2	108.1	158.3
	500/450	**19.1**	68.2	110.8	192.6	246.2
	250/225	**30.5**	123.6	271.5	368.0	482.7
1500VA LV Rack	1500/1350	**5.5**	23.2	47.5	71.4	91.8
	1125/1013	**8.1**	33.6	71.7	96.6	130.0
	750/675	**14.0**	63.8	113.0	167.5	223.6
	375/338	**31.0**	121.0	233.5	334.7	367.3
1500VA HV Rack	1500/1350	**5.5**	24.6	46.0	69.0	89.8
	1125/1013	**7.7**	32.1	68.6	95.9	126.3
	750/675	**14.2**	61.6	111.8	172.2	221.5
	375/338	**29.4**	115.0	218.5	335.5	374.0
2000VA LV Rack	2000/1800	**6.4**	32.0	59.0	88.4	112.0
	1500/1350	**9.7**	45.5	84.5	125.0	164.0
	1000/900	**17.6**	70.0	136.0	190.0	254.0
	500/450	**40.5**	157.0	271.0	396.0	526.0
2000VA HV Rack	2000/1800	**6.0**	33.0	59.0	88.0	119.0
	1500/1350	**9.0**	47.0	83.0	130.0	161.0
	1000/900	**16.5**	71.5	129.0	183.0	260.0
	500/450	**40.0**	155.0	277.0	398.0	509.0
2500VA LV Rack	2500/2250	**5.8**	21.5	42.0	64.0	89.0
	1875/1688	**8.7**	29.8	62.0	89.0	129.0
	1250/1125	**14.0**	48.0	89.0	142.0	192.0
	625/563	**28.0**	110.0	211.0	295.0	390.0
2500VA HV Rack	2500/2250	**5.8**	20.0	40.0	60.0	87.0
	1875/1688	**8.5**	28.0	57.0	96.0	120.0
	1250/1125	**14.7**	50.0	87.0	138.0	191.0
	625/563	**30.0**	112.0	219.0	279.0	401.0
3000VA LV Rack	3000/2700	**3.3**	20.0	36.5	53.0	71.0
	2250/2025	**5.1**	27.0	54.0	79.5	106.0
	1500/1350	**9.8**	48.5	89.0	123.0	164.0
	750/675	**27.6**	105.0	183.0	264.0	358.0
3000VA HV Rack	3000/2700	**3.5**	18.5	34.0	53.0	69.0
	2250/2025	**5.0**	29.0	53.0	79.0	102.5
	1500/1350	**9.1**	45.0	84.0	122.0	165.0
	750/675	**26.5**	102.0	175.0	263.0	344.0

All backup time in minute

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

5 Mechanical

5.1 Size and weight

	700 Tower	1000 Tower	1500 Tower	2000 Tower	3000 Tower
Height (±5.0mm, ±0.20in) (Not to exceed)	231 mm (9.1 in)	231 mm (9.1 in)	231 mm (9.1 in)	325 mm (12.8 in)	325 mm (12.8 in)
Width (±5.0mm, ±0.20in) (Not to exceed)	160 mm (6.3 in)	160 mm (6.3 in)	160 mm (6.3 in)	214 mm (8.4 in)	214 mm (8.4 in)
Depth (±5.0mm, ±0.20in) (Not to exceed)	354 mm (13.9 in)	384 mm (15.1 in)	434 mm (17 in)	412 mm (16.2 in)	412 mm (16.2 in)
Weight (UPS)	12 Kg (26.5 Lbs)	14 Kg (30.9 Lbs)	19 Kg (41.8 Lbs)	35 Kg (77.2 Lbs)	35 Kg (77.2 Lbs)
Weight (EBM)	NA	19 Kg (41.8 Lbs)	24 Kg (52.9 Lbs)	NA	50 Kg (110.2 Lbs)

	700 Rack	1000 Rack	1500 Rack	2000 Rack	3000 Rack
Height (±5.0mm, ±0.20in) (Not to exceed)	86.5 mm (3.4 in)	86.5 mm (3.4 in)	86.5 mm (3.4 in)	86.5 mm (3.4 in)	86.5 mm (3.4 in)
Width (±5.0mm, ±0.20in) (Not to exceed)	438 mm (17.3 in)	438 mm (17.3 in)	438 mm (17.3 in)	438 mm (17.3 in)	438 mm (17.3 in)
Depth (±5.0mm, ±0.20in) (Not to exceed)	430 mm (16.9 in)	430 mm (16.9 in)	430 mm (16.9 in)	600 mm (22.6 in)	600 mm (22.6 in)
Weight (UPS)	16 Kg (35.2 Lbs)	16 Kg (35.2 Lbs)	19.5 Kg (43 Lbs))	29 Kg (63.9 Lbs)	29.5 Kg (65 Lbs))
Weight (EBM)	NA	22.1 Kg (48.7 Lbs)	28.1 Kg (62 Lbs)	NA	41.1 Kg (90.4 Lbs)

5.2 Color

bezel and front panel	RAL 9005
Lens	Pantone Black 6 C (R17 G28 B36)
Logo, symbol, button	Pantone 877 C (Silver)

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

5.3 AC Output Distribution

Segment 1, **Segment 2**

Model	L Model	G Model	i/G-EU Model	G-AU Model
700 Tower	(3) NEMA 5-15R (3) NEMA 5-15R	NA	(3) IEC320 C13 (3) IEC320 C13	(2) Aust 10A (2) Aust 10A
1000 Tower	(3) NEMA 5-15R (3) NEMA 5-15R	(1) NEMA L6-20R (1) NEMA 6-20R (1) NEMA 6-20R	(3) IEC320 C13 (3) IEC320 C13	(2) Aust 10A (2) Aust 10A
1500 Tower	(3) NEMA 5-15R (3) NEMA 5-15R	NA	(3) IEC320 C13 (3) IEC320 C13	(2) Aust 10A (2) Aust 10A
2000 Tower	(1) NEMA L5-20R (2) NEMA 5-20T (2) NEMA 5-20T	(1) NEMA L6-20R (2) NEMA 6-20R (2) NEMA 6-20R	(4) IEC320 C13 (1) IEC320 C19 (4) IEC320 C13	(1) IEC320 C13 (3) Aust 10A (2) Aust 10A
3000 Tower	(1) NEMA L5-30R (2) NEMA 5-20T (2) NEMA 5-20T	(1) NEMA L6-30R (2) NEMA 6-20R (1) NEMA L6-20R	(4) IEC320 C13 (1) IEC320 C19 (4) IEC320 C13	(1) IEC320 C19 (3) Aust 10A (2) Aust 10A
700 Rack	(3) NEMA 5-15R (3) NEMA 5-15R	NA	NA	NA
1000 Rack	(3) NEMA 5-15R (3) NEMA 5-15R	(1) NEMA L6-20, (1) NEMA 6-20R (1) NEMA 6-20R	(3) IEC320 C13 (3) IEC320 C13	(1) Aust 10A (2) IEC320 C13 (1) Aust 10A 2) IEC320 C13
1500 Rack	(3) NEMA 5-15R (3) NEMA 5-15R	NA	(3) IEC320 C13 (3) IEC320 C13	(1) Aust 10A (2) IEC320 C13 (1) Aust 10A 2) IEC320 C13
2000 Rack	(1) NEMA L5-20R (3) NEMA 5-20T (3) NEMA 5-20T	(1) NEMA L6-20, (2) NEMA 6-20R (2) NEMA 6-20R	(4) IEC320 C13 (1) IEC320 C19 (4) IEC320 C13	(2) Aust 10A (2) IEC320 C13 (2) Aust 10A 2) IEC320 C13
3000 Rack	(1) NEMA L5-30R (3) NEMA 5-20T (3) NEMA 5-20T	(1) NEMA L6-30R, (1) NEMA L6-20R, (2) NEMA 6-20R	(4) IEC320 C13 (1) IEC320 C19 (4) IEC320 C13	(2) Aust 10A (2) IEC320 C13 (2) Aust 10A 2) IEC320 C13

5.4 Output cables accessories

Model	i/G-EU Model	G-AU Model
700VA	(2) IEC-IEC 10A; (1) IEC320/10A to Schuko 3-strip	(2) IEC-IEC 10A
1000VA		
1500VA		
2000VA	(2) IEC-IEC 10A; (1) IEC320/16A to Schuko 3-strip	(2) IEC-IEC 10A
3000VA		(2) IEC-IEC 10A (1) IEC-IEC 16A

No output cable accessories for L and G models

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

5.5 AC Input connection

Model	L Model	G Model	i/G-EU Model	G-AU Model
700VA	NEMA 5-15P 1.8m attached cord	IEC C14 (10A) recessed plug		
1000VA				
1500VA				
2000VA	NEMA 5-20P 1.8m attached cord			
3000VA	NEMA L5-30P 1.8m attached cord	IEC C20 (16A) recessed plug		

The G model units (208 VAC) have one input cord that is 1.8 meters in length, measured between the inside edges of the connectors. These cords have C14 (<3000VA) or C20 (3000VA) type female connector and L6-20P (<3000VA) or L6-30P (3000VA) male connector.

The i/G-EU model units (230 VAC) have one input cord that is 1.8 meters in length, measured between the inside edges of the connectors. These cords have C14 (<3000VA) or C20 (3000VA) type female connector and Schuko male.

The A model units (240 VAC) have one input cord that is 1.8 meters in length, measured between the inside edges of the connectors. These cords have one Australian type male plug and one female CEE socket. The entire input cord shall be Australian Energy Authority approved.

5.6 Other accessories

- Rail kit (for rack model only)
- Rs-232 serial cable
- USB communication cable
- User manual
- Software Suite CD Rom

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

6 Protocol and Communication Ports

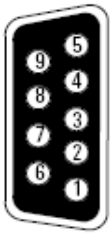
6.1 Protocol

Reference the attached PW9130 XCP compliance Document (Doc # 1027537).

6.2 Communication Port

6.2.1 Rs232 Serial port

RS-232 communication port that support industry standard specifications including dry contact for basic alarms. Interface with Powerware communication protocol (XCP).

dB9	Pin#	Signal	Direction (from UPS)	Function
	1	DCD	Output	Low Battery Output [1,3]
	2	RxD	Output	RxD Output
	3	TxD	Input	TxD / Inverter Off Input [2]
	4	DTR	Input	No used
	5	Common	--	Signal Common tied to chassis
	6	DSR	Output	No used
	7	RTS	Input	No connection
	8	CTS	Output	AC Fail Output [1,3]
	9	RI	Output	+12 Vdc Power

[1] Configurable through Relay configuration setting

[2] If Pin 3 receives a Low (+V) signal for more than 5s, the UPS executes the command selected by the Signal Inputs setting

[3] When the selected condition is active, output signals on Pin 1 and 8 shift from Low (positive voltage) to High (negative voltage)

6.2.2 USB Port

The USB port is according to the following specification:

- Low speed device compatible with the Universal Serial Bus 2.0.
- Universal Serial Bus Device Class Definition for Human Interface Devices (HID). Release 1.0
- Universal Serial Bus Usage Tables for HID Power Devices. Release 1.0 version 4.0.

Note: The USB and DB9 serial port can not operate simultaneously as they are using the same UART on the CPU. The USB or DB9 serial port and the BestDock serial communication can operate in parallel.

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

6.2.3 Interface Slot

By complying with this specification, this guarantees compatibility with the XCP SNMP/Web card and the Relay card (AS/400 compatible).

Communication Slot Pin-out Definition

pin	description	board signal	option that uses the pin
1	Ground (common for pins 1-10)	GND-S	SNMP/Web Adapter Relay / AS400 Card
2	Plug-in Card power; +12 VDC (same spec as for 9120)	+VCC	SNMP/Web Adapter
3	RS232 receive function: UPS RxD from Plug-in Card (output from card) at RS232 serial levels, 9600 bps, 8 data, no parity, 1 stop bit Signal input functionality: If this pin receives a RS-232 Low (+VDC signal) for at least 5 seconds, the UPS executes a function selected by the setting “signal inputs”	RxD1	SNMP/Web Adapter Relay / AS400 Card
4	UPS TXD to Plug-in Card (input to card) at RS232 serial levels, 9600 bps, 8 data, no parity, 1 stop bit	TxD1	SNMP/Web Adapter
5	Unused	-	N/C
6	Unused	-	N/C
7	Unused	-	N/C
8	Unused	-	N/C
9	Ground (common for pin 1-10)	GND-S	SNMP/Web Adapter
10	+12 VDC (SNMP power), tied in parallel to pin 2	+VCC	SNMP/Web Adapter Relay / AS400 Card
11	Reserved	-	N/C
12	Reserved	-	N/C
13	Reserved	-	N/C
14	Reserved	-	N/C
15	Reserved	-	N/C
16	Reserved	-	N/C
17	Unused	-	N/C
18	Shutdown in any mode (remote shutdown by default), active low (configurable input to UPS)	Re5	Relay / AS400 Card
19	Summary alarm signal (configurable), active high (output from UPS)	Re2	Relay / AS400 Card
20	On bypass signal (configurable), active high (output from UPS)	Re4	Relay / AS400 Card
21	Line fail / on battery signal (configurable), active high (output from UPS)	Re3	Relay / AS400 Card
22	Unused	-	N/C
23	Common for pins 17-26		Relay / AS400 Card
24	Low battery signal (configurable), active high (output from UPS)	UPS DE	Relay / AS400 Card
25	Unused	-	N/C
26	+12 VDC, separate from pins 2 and 10	+12V	Relay / AS400 Card

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

6.2.4 Relay outputs

One relay interface as a standard (NO+NC relay), two integrated into the RS232 port (Optocoupler), and four in optional Compact XSlot relay card (NO+NC relay).

All relay outputs are programmable with the following options

- UPS ok
- on bypass
- on battery
- battery low
- ext. charger on

6.2.5 REPO

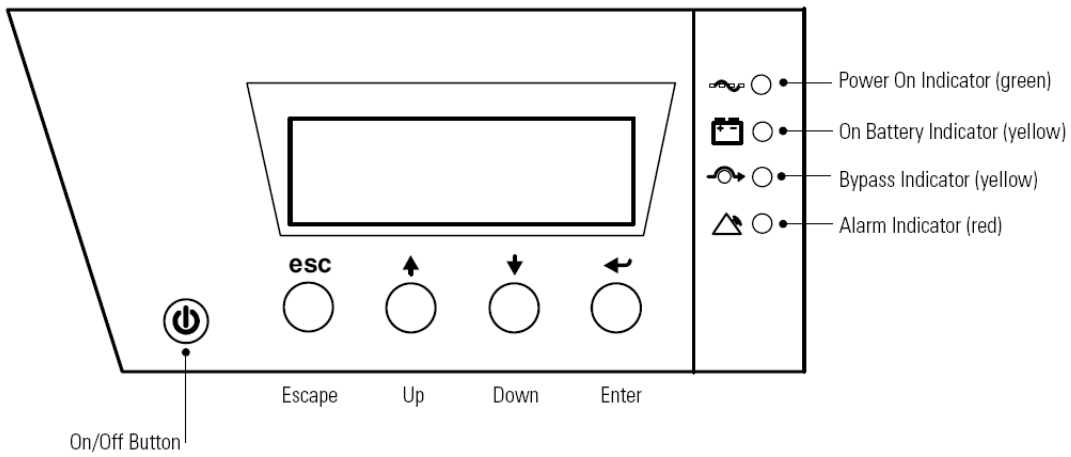
An active REPO (Remote Emergency Power Off) input generates an immediate shutdown of the unit. Internal power supply stays on (alarm to the user). Battery relay is opened when exist. Automatic restart of the unit is not allowed in any situation after REPO.

REPO input polarity can be changed by a user setting. The input can be disabled or configured for other use by a service setting.

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

7 Controls and user interface

7.1 User interface description



- Four LEDs
- 16 characters X 2 line LCD, Graphical format, LED blue light type, +5VDC LCD power supply, +4.2VDC backlight power supply.
- Four push-buttons to navigate through the display menu.
- On/Off Button
- Buzzer

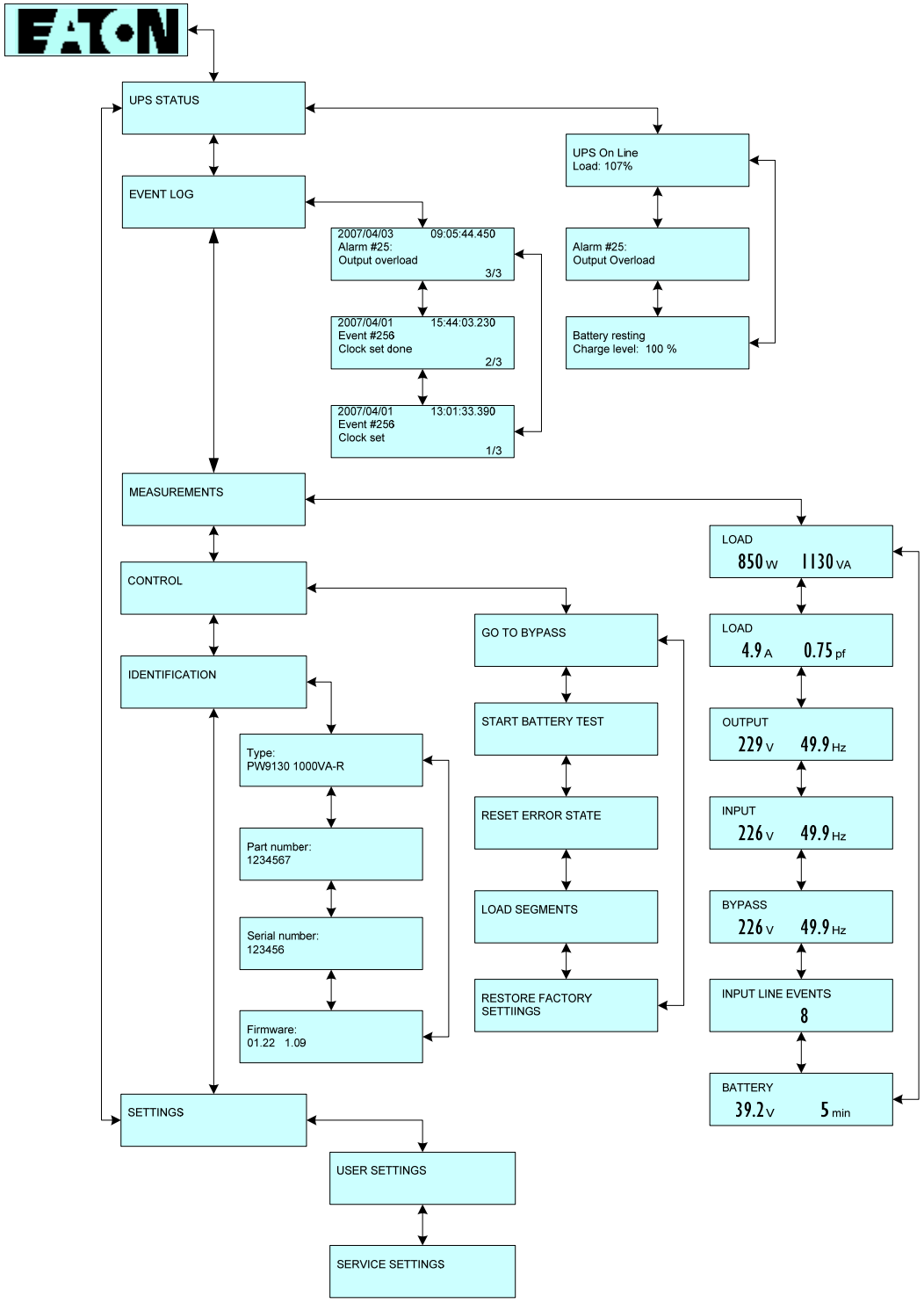
State	UPS ON	On battery	On bypass	Alarm
Power on	o	o	o	• 1)
Standby	o	o	o	• 1)
Line operation	• / ✹ 2)	o	o	• 1)
Converter	• / ✹ 2)	o	o	• 1)
Battery operation	• / ✹ 2)	• / ✹ 4)	o	• 1)
Battery test	• / ✹ 2)	o	o	• 1)
Bypass operation	• / ✹ 2)	o	•	• 1)
High Efficiency (Eco)	• / ✹ 2)	o	o	• 1)
Fault	• / ✹ / o 3)	o	• / o 3)	•
Shutdown	o	o	o	o

o = LED is off, • = LED is on, ✹= LED is blinked (0.5s On, 0.5s Off)

1) when an alarm is active
2) if there is an active notice –
3) the unit may be with output off or supply load on bypass
4) LED is blinked if battery voltage goes below the warning level

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

7.2 Menu structure



This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

8 Environmental

8.1 Ambient Temperature Range

Operating: 0 degree C to +40 degree C for altitude 0 to 1500 meter above sea (0 degree C to +35 degree C for altitude 1500 to 3000 meter)

Non-operating:-15 degree C to +50 degree C

8.2 Humidity

0% to 95% non-condensing

8.3 Altitude:

3000 m (10,000 ft max.) without power derating when operated within the temperature range specified in section 7.1.1

8.4 Cooling and audible noise

The UPS is forced air cooled by fans, which shall operate only when needed to maintain internal temperatures to acceptable levels. Air intake shall be through the front of the unit and exit trough the rear. Cooling is managed through four fan speed level described below :

Ambient, Operation Mode	Load	Speed Level	Fan.V	Max Audible Level (*)		
				0.7~1kVA	1.5kVA	2~3kVA
Ta<30°C & Line mode	<75%	1 (lowest)	9V	43 dBA	43 dBA	50 dBA
	>=75%	2 (low)	10V	44 dBA	45 dBA	52 dBA
Other (excluding bypass)	<25%	1 (lowest)	9V	44 dBA	43 dBA	48 dBA
	25~50%	2 (low)	10V	46 dBA	44 dBA	49 dBA
	50~75%	3 (high)	11V	48 dBA	48 dBA	51 dBA
	>=75%	4 (highest)	12V	51 dBA	49 dBA	52 dBA
Bypass mode	all	4 (highest)	12V	51 dBA	49 dBA	52 dBA

(*) measured at 100cm from the front

8.5 Mean time between failure (MTBF)

The calculated mean time between failure for the UPS :

- **150k hours** (0.7~1.5kVA)
- **120k hours** (2~3kVA)

when operated at an ambient temperature of 25 degree C and 100% resistive load, assuming the duty cycle for back up mode to be once per week. The calculation is based upon MIL-SPEC 217 Revision F standard. The MTBF calculation does not include the battery or cooling fan. This calculated MTBF shall be demonstrated by means of ongoing long term testing.

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

8.6 Heat dissipation

Model	W	BTU/h
Rack 700LV	103	350
Tower 700HV	94	321
Tower 700LV	103	353
Rack/Tower 1KHV	130	443
Rack/Tower 1KLV	140	479
Rack/Tower 1.5KHV	175	599
Rack/Tower 1.5KLV	196	670
Rack 2KVA HV	216	736
Rack 3KVA HV	287	978
Rack 2KVA LV	252	861
Rack 2.5KVA	239	815
Rack 3KVA LV	313	1069
Tower 2KVA HV	207	705
Tower 3KVA HV	283	967
Tower 2KVA LV	236	806
Tower 3KVA LV	317	1081

8.7 Other

RoHS according to EU directive 2002/95/EC

This specification is the property of Eaton Corp. and shall not be reproduced or copied or used as the basis for manufacture or sale of apparatus without permission

SERVICE MANUAL

PW9130 0.7/1/1.5/2/2.5/3kVA

UNINTERRUPTIBLE

POWER SYSTEM

MENU

WARNING

(For qualified service personnel only)

1. DO NOT perform any internal service or adjustment of this product unless another person is capable of rendering first aid and resuscitation is present.
2. Dangerous voltage exists at several points in this product. To avoid personal injury, don't touch any exposed connections or components while power is on.
3. Turn off the UPS and disconnect the UPS to the mains before removing outside protective cover.
4. AC voltage is always present if the input AC power is still available.
5. High voltage may present at DC capacitors. Before opening the outside cover, wait for at least five minutes after turning off the UPS.
6. Verify input source (voltage and frequency) before service.

CAUTION

1. After opening the cover, please always check the tightness of all wires, connectors, and screws first. Then check if there is any discolored components inside.
2. DO NOT make internal batteries short-circuited.
3. After service, verify the polarity of batteries, the tightness of all screws and connectors before restarting the UPS.

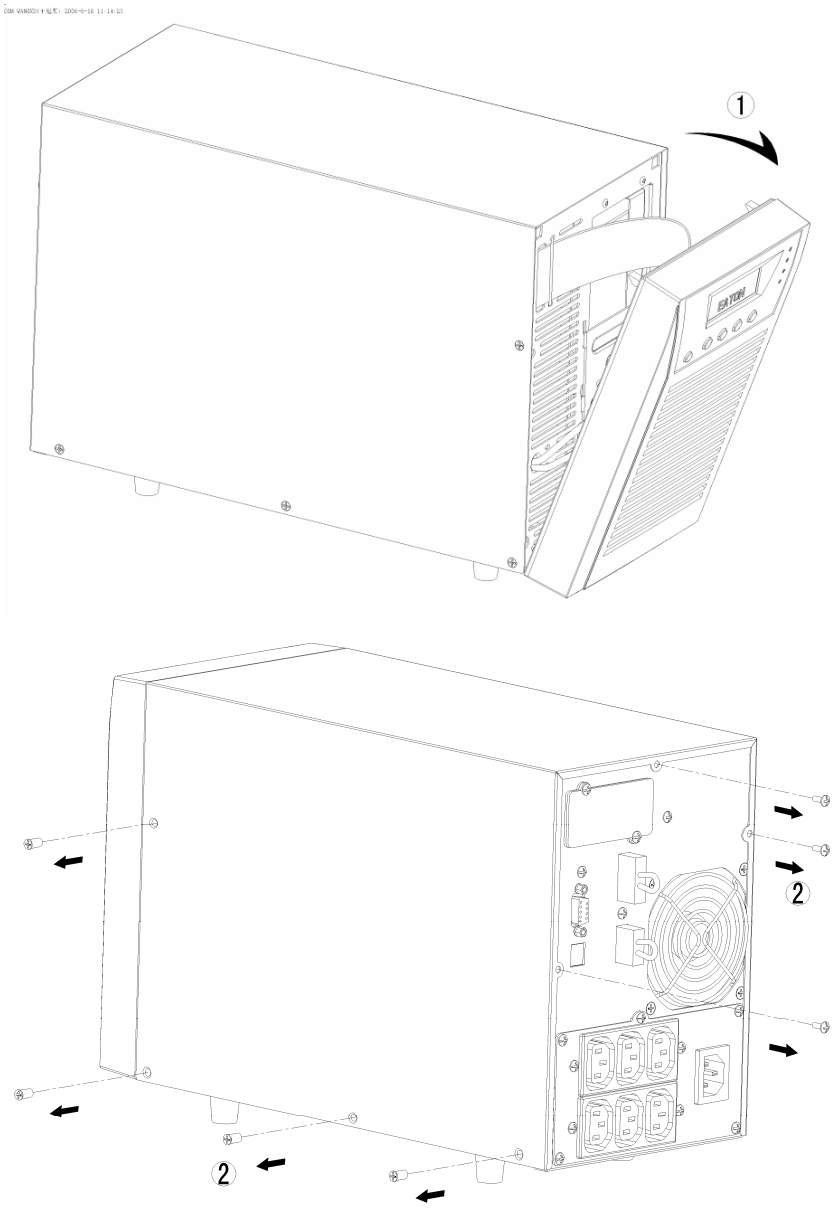
STEPS TO OPEN THE CASE

(MODEL: PW9130 0.7/1/1.5/2/3kVA on-line UPS)

APPLICABLE MODEL

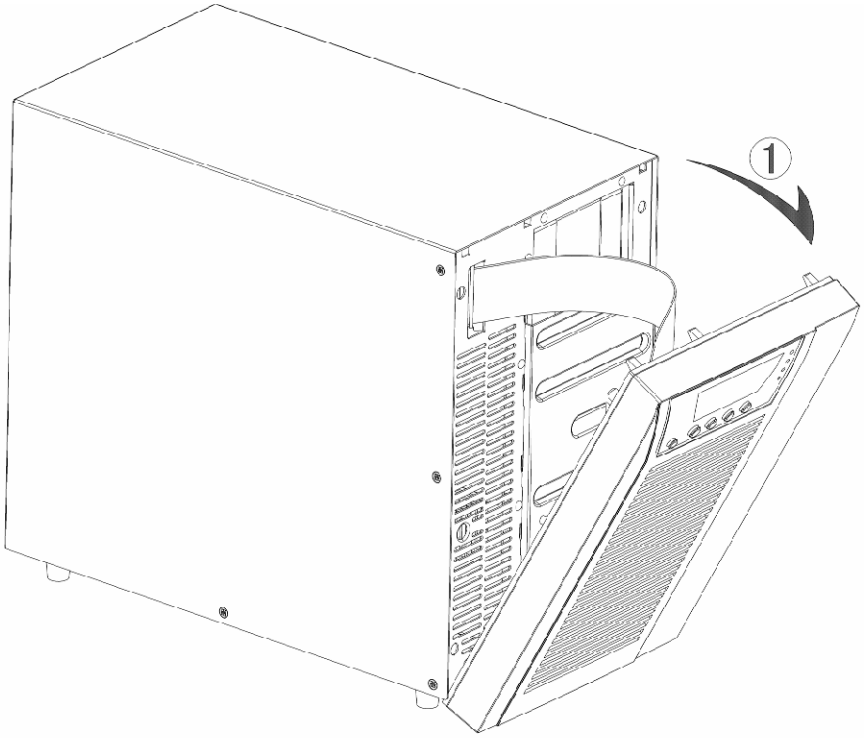
Model: PW9130 0.7kVA/1kVA/1.5kVA Tower version

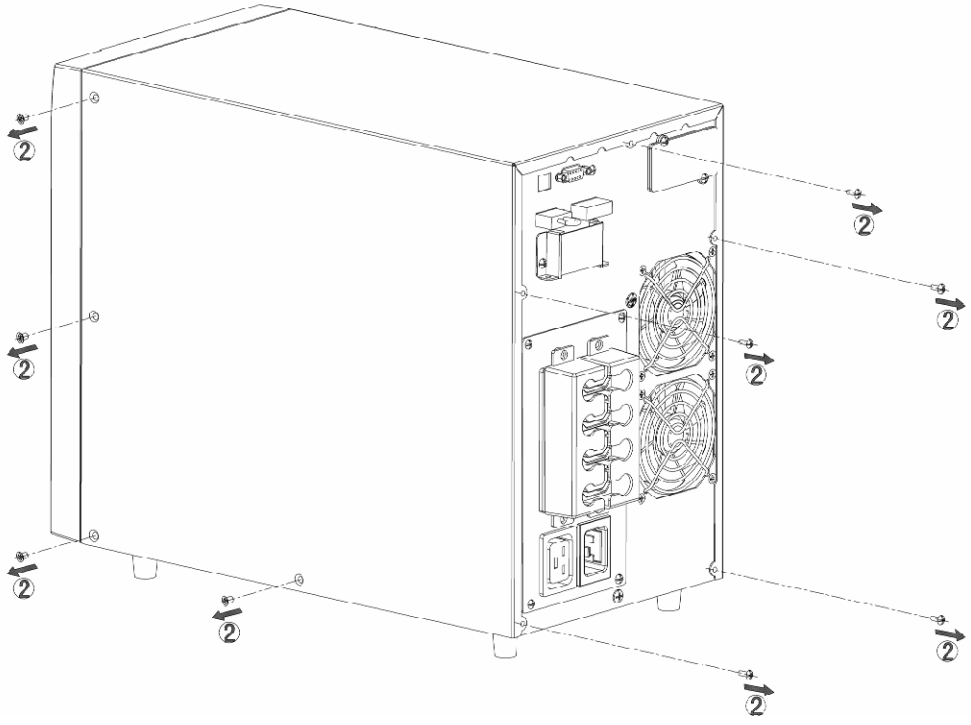
PLEASE FOLLOW THE STEPS TO OPEN THE CASE



Model: PW9130 2/3kVA Tower version

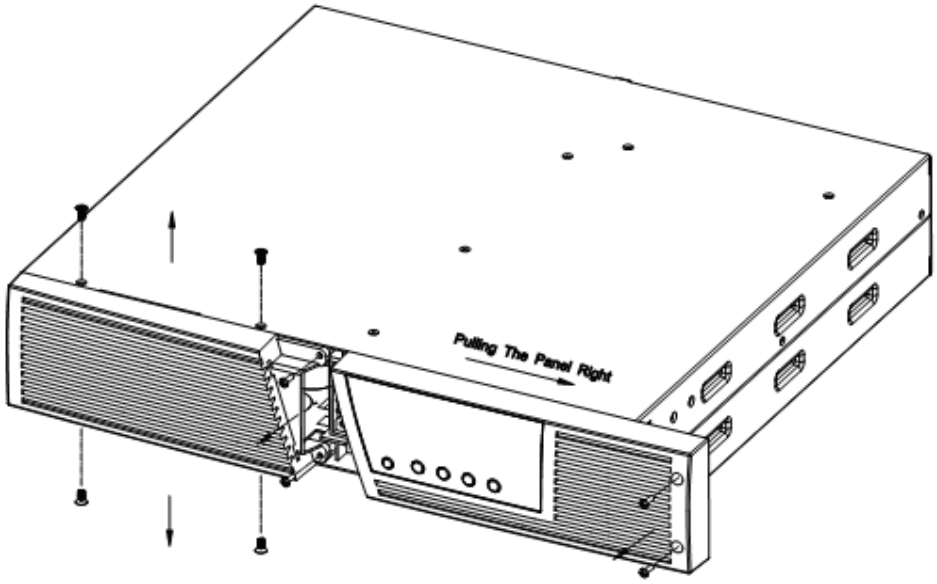
PLEASE FOLLOW THE STEPS TO OPEN THE CASE

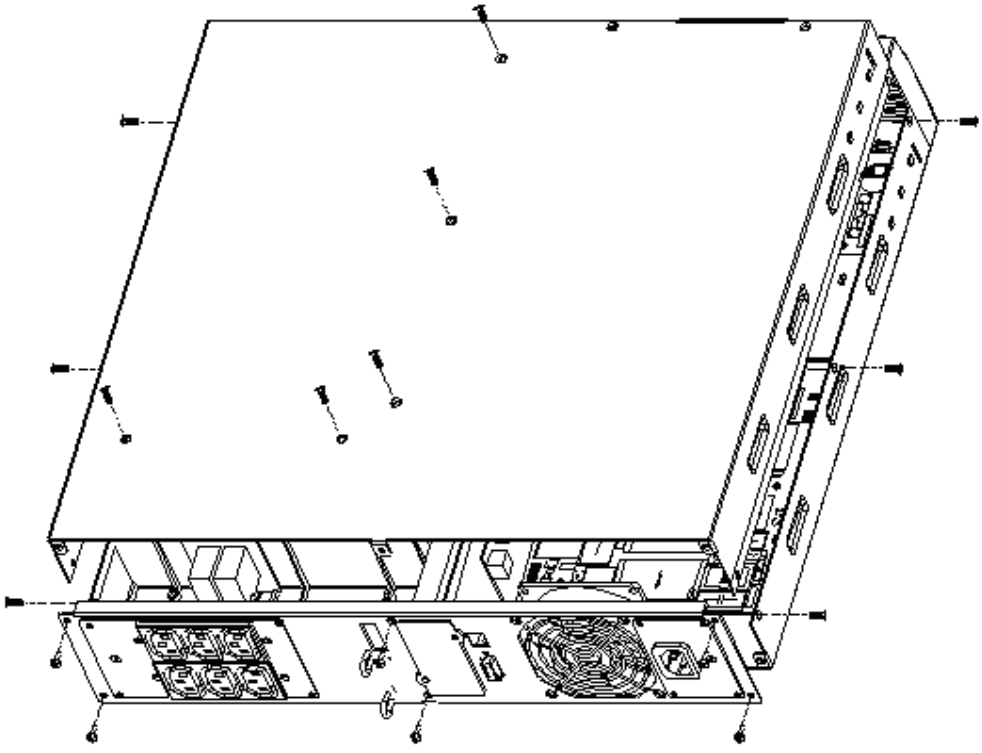




Model: PW9130 1/1.5kVA R/T version

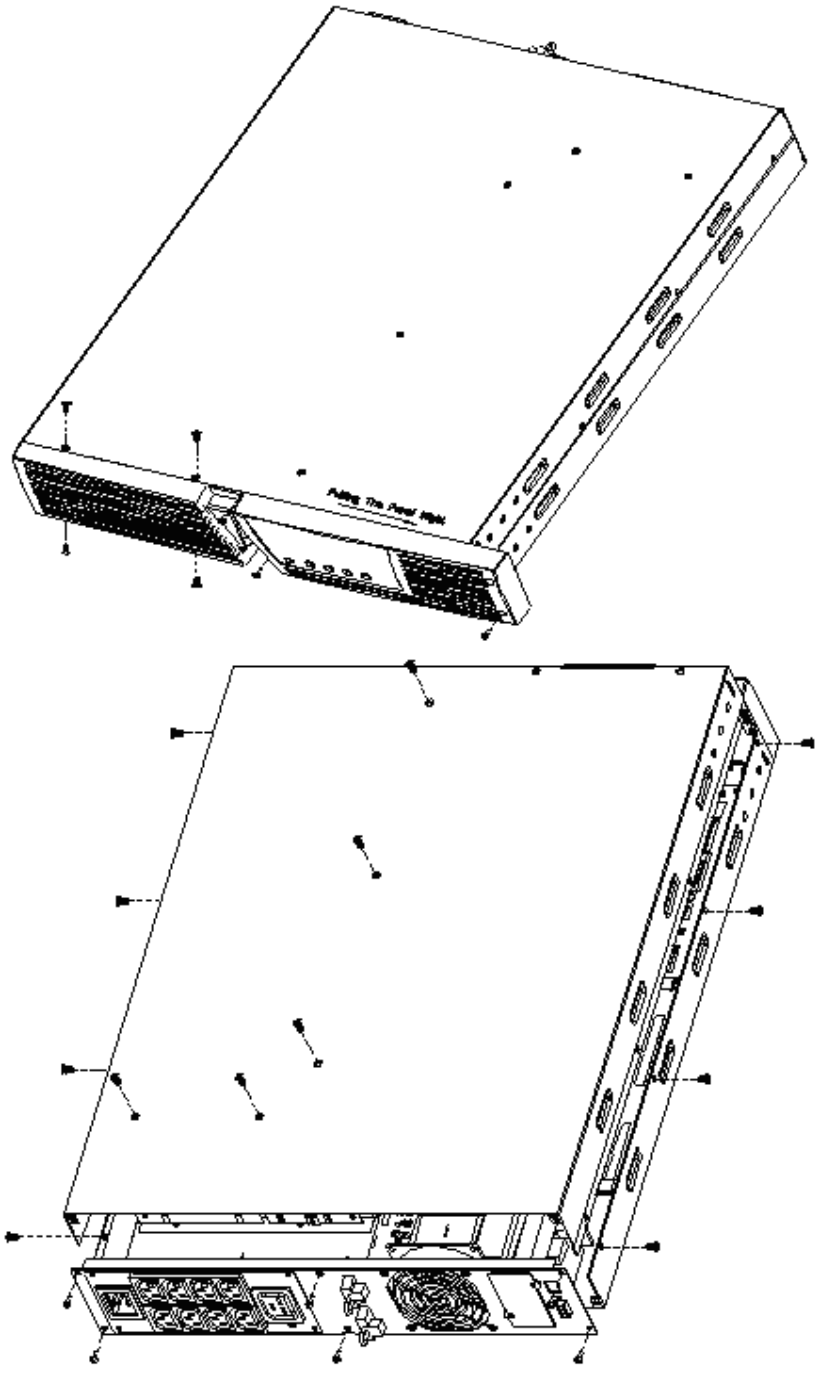
PLEASE FOLLOW THE STEPS TO OPEN THE CASE





Model: PW9130 2/3kVA R/T version

PLEASE FOLLOW THE STEPS TO OPEN THE CASE



I. INTRODUCTION

For all UPS of this series, they are strictly tested and carefully designed. We always do our best to make our products more reliable and safer, this is also the goal of our company. However, due to the lifetime of electrical components and some unpredictable reasons, there will be unavoidable failures of the UPS. If this situation occurs, service of qualified person is needed. This service manual will guide the technicians to repair and adjust the problematic UPS. If the UPS still does not work properly, please contact with us and we will be glad to solve any problems you met.

Because of the following unique features of UPS (Uninterruptible Power System), it is very easy to maintain and service.

* All major power components are put on PCB.
* Major parts are simply connected with flexible insulated wires and plugs.
* All PCBs are interconnected with connectors.

This service manual consists of 4 major parts:

1. Introduction.
2. Principle of operation: It describes the functions and principles of each part.
3. Alignments: It describes the locations and methods needed to adjust the UPS.
4. Trouble shooting: This part describes the possible failure conditions and procedures to repair it.

Before starting to serve the UPS, be sure to read this manual carefully for a correct and safe operation.

II.THEORY OF OPERATION

1. INTRODUCTION

This 0.7/1/1.5/2/3KVA high input power factor system contains three major PCBs assemblies. They are including:

A. PSDR: contains major parts of (1) soft-start, (2) control power supply, (3) unit power factor correction, (4) DC/DC converter, (5) inverter, (6) transfer relay.

B. CNTL: contains major parts of protection, signaling circuits, regulation and control circuits. Fixed on PSDR with screws.

C. CHGR: contains DC-DC regulation and control circuits. Fixed on PSDR.

The simplified schematics in figure 1 shows how the major circuits are connected and illustrated the overall system functions. The locations of these assemblies in this machine are shown in figure 5-7.

The block diagram in figure 2, shows the UPS at normal operation from left to right. When a protection circuit is triggered or a fault condition occurs, the output supply is transferred immediately from inverter to AC mains. The operation principle will be explained in later section.

Basically, this ON-LINE UPS system utilizes high frequency PWM techniques to achieve high efficient performance. The UPS can deliver a clean, regulated sine-wave output at any load under full load. The sub-systems are described at next section:

III.PCB FUNCTION

1. POWER STAGE (PSDR)

The power stage consists of soft-start, control power supply, unit power factor correction, DC/DC converter and inverter. The figure 2 shows the block diagram of power stage.

(1) SOFT-START SUB-SYSTEM:

The purpose of soft start circuit is to suppress the I/P inrush current.

(2) CONTROL POWER SUPPLY SUB-SYSTEM:

The input of the control power supply is connected to the battery bus, i.e., the output

of charger. The output of control power supplies provides +12Vdc for the IC's working voltage, the coil of relay and the fan(s) voltage. 5Vdc is used for DSP's working voltage. The control power supplies works only when the 12Vdc regulator supplies Vcc to its control IC. To have proper operation of 12Vdc regulator, its input power is controlled by the switch that indicated in figure 4.

(3) INPUT POWER FACTOR CORRECTION SUB-SYSTEM:

The purpose of power factor correction (PFC) circuit is to make the input current and voltage in phase and therefore achieve a high input power factor. The schematic is indicated in figure 2.

When connect the UPS to the mains, the AC power goes through noise filter to the line detector. Then press the "on" switch, the P.F.C. circuit is enabled and the DC buses are regulated at 360Vdc for 230Vrms series and 190Vdc for 120Vrms series.

(4) DC/DC converter SUB-SYSTEM:

The major function of the UPS is to deliver accurate AC power to the loads connected to it whenever the AC line is uncorrected or failed. In this system, the battery release the stored energy to supply inverter immediately upon AC line fails.

Refer to figure 2, the battery voltage is transformed through a DC/DC converter to DC buses for inverter (Battery V: 20~27.3Vdc for 0.7kVA,30~40.95Vdc for 1kVA，40~54.6Vdc for 1.5kVA,60~81.9Vdc for 2/3kVA; DC buses: ±380Vdc for HV model and ±200Vdc for LV model). When the line fails, the DC sources are caught up to supply the power needed by the inverter immediately.

(5) INVERTER SUB-SYSTEM:

The UPS transfers ±DC bus voltages to the AC output voltage through an inverter of half bridge configuration at normal operation. The schematic diagram of inverter is shown in figure 2.

To construct a high frequency (19.2kHz) PWM inverter, the drivers receive switching signals from PWM generation circuit through a pair of photo-couplers to trigger the upper IGBT and the lower IGBT alternately.

2. MAIN CONTROL PCB ASSEMBLIES (CNTL)

These assemblies are the control center of UPS. It is composed of three major circuits as following:

(1) Regulation & control
(2) Protection
(3) Signaling

(1) REGULATION & CONTROL SUB-SYSTEM :

This portion can be seen as brain of the UPS. It provides the control pulses to the switching elements which deliver power to the output. The sub-system also regulates the output to ensure that the UPS is delivering constant AC voltage to the loads.

The inverter signal is sensed directly by resistor division. It is compared with a reference signal from sine wave generator. The difference of these two signals (error signal) alter the pulse widths of PWM signals which control the duty cycles of switching elements to regulate the output voltage within specification.

When the main is applied and the switch is turned on, a 10-seconds timer is triggered. The bypass relay stays at bypass position in this time period. At the end of this period, the bypass signal is removed and the relay transfers to inverter output.

(2) PROTECTION SUB-SYSTEM:

The UPS provides the following protection circuits:

A. Overload protection

The load detector senses the load current. i.e. the inverter current, and sends the signal by two paths. In battery mode, the UPS will go to failure mode if overload condition happened. The panel will indicate the fault condition. There are two kinds of protection in our UPS:

(a)Overload Protection: The UPS collects the continuous overload signals through DSP switch the bypass relay.

---- If the output load is between 100% and 102% of rated load (VA or Wattage), the UPS always keeps running on inverter with overload warning.

---- If the output load is between 103% and 130% of rated load, the UPS keeps running on inverter running for 12 seconds.

After 12 seconds: UPS transfer to bypass which if UPS is under line mode. UPS transfer to failure mode which if UPS is under battery mode.

---- If the output load is between 130% and 150% of rated load, the UPS keeps running on inverter running for 2 seconds.
After 2 seconds: UPS transfer to bypass which if UPS is under line mode. UPS transfer to failure mode which if UPS is under battery mode.

---- If the output load is higher than 150% of rated load, the UPS transfers to bypass immediately which if UPS is under line mode or shut down which if UPS is under battery mode.

(b)Cycle by Cycle Current Limit: When output loads sink a high surge current, a high inverter current is detected and the inverter switches, i.e. the IGBTs, are turned off pulse by pulse to protect themselves from thermal runaway. The output relay stays at inverter output position unless a continuous overload is detected or an abnormal inverter operation occurs.

B. Battery over or under shut down

Upon the battery voltage declines to battery-under level, a signal is generated to cut off the power supply of the whole system, The buzzer becomes silent and all the LED's extinguish. When the utility is coming, the UPS will start up automatically.

In case of the battery voltage is high voltage, the UPS will discharge the battery by the way of DC-DC converter to insure the lifetime of batteries. The panel will indicate the fault condition.

C. Inverter output abnormal protection

The inverter failure signal shuts down the inverter immediately, makes the buzzer a continuous alarm, and lights "ALARM" LED. The panel will indicate the fault condition. "The failure signal latches itself unless On/off key or battery is less than 10.5v".

D. Over temperature protection

The thermal sensors detected the temperature of the heat sink on PSDR and the ambient. They are electrically connected to the DSP, and deliver temperature information to the DSP. If there is a over temperature condition,

the panel will indicate the fault condition.

E. Bus over voltage protection

To protect any BUS over voltage condition especially for the half-bridge load. The panel will indicate the fault condition.

(3) SIGNALING SUB-SYSTEM :

When the AC line is unable to supply, batteries release stored energy to supply the inverter immediately. At the same time, the utility failure relay is activated and the buzzer beeps every four seconds.

Upon the batteries are discharged to battery-low level, the battery-low relay is activated and the buzzer beeps every second.

Remote shutdown signal is enabled only when the line fails. The signal is connected to the battery detector. It generates battery-under signal to cut off the bias power supply of the UPS system.

3. OUTPUT SUB-SYSTEM

The output of IGBT is filtered by a LC circuit to reduce the o/p voltage harmonic distortion.

The output relay receives signal from control circuit to switch the output of the UPS from bypass to inverter.

4. CHARGER (CHGR)

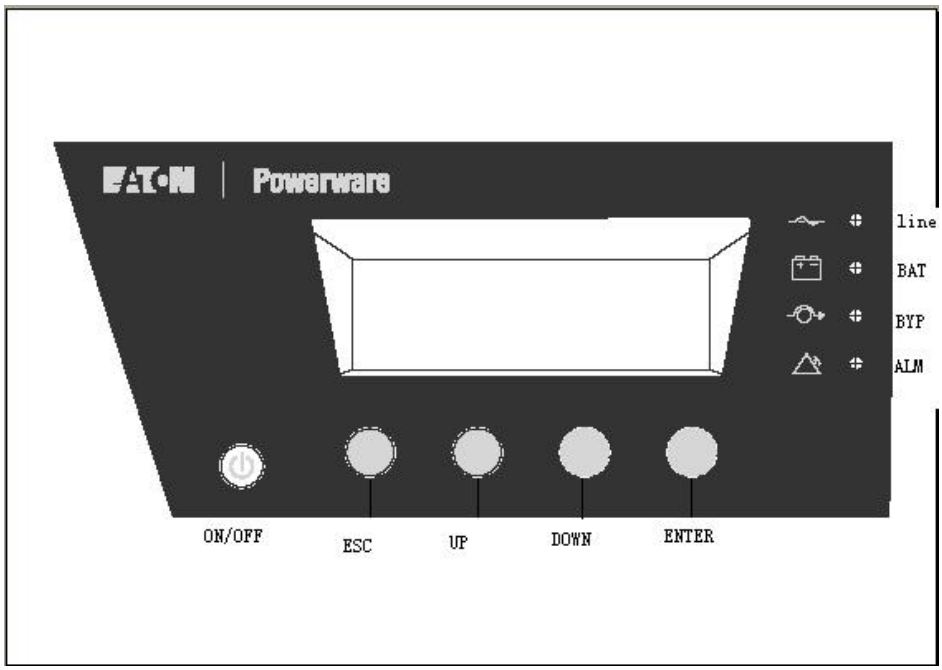
The purpose of charger is maintaining the batteries at fully charged condition. Refer to figure 3, the flyback switching power supply provides DC voltage for batteries.

Charge status	Charge voltage	Comment
Charging	2.38v/cell(25℃)	The end voltage is 2.33v/cell(25℃)
floating	2.31v/cell(25℃)	
resting	Only supply the SPS and switch off the battery	

Besides providing voltage, the power supply also limits the current flowing into batteries to protect and prolongs the lifetime of batteries. The ABM control is applied on the charger,

the charging method can be selected by users. And In ABM charge and float modes, and when ABM charging cycles are disabled, the charger voltage reference is adjusted according to the battery temperature.

5. FRONT PANEL



(1)Buzzer

There are three status on buzzer states.

Buzzer enable – The buzzer would alarm normally when fault or warning occurred.

Buzzer disable – The buzzer would not alarm even if the other fault or warning ocurred.

Buzzer mute – The buzzer would not alarm in this fault or warning. if the other fault or warning happened, the buzzer will alarm again.

The buzzer can be set enable/disable via LCD Setting menu or mute by any control Key

UPS condition	Buzzer
On sequence	Buzzer on 0.5s->off 0.5s -> on 0.5s->off 0.5s
Off sequence	Buzzer on 3 s
On battery mode without alarm	Buzzer on 0.5s->off 4.5s
On bypass mode/ECO mode without alarm	Buzzer on 0.5s->off4.5s
On line mode without Notice and Alarm	Buzzer off
On line mode with Notice	Buzzer on 0.5s->off 4.5s
Alarm active	Buzzer on 0.5->off 0.5s

Short tick	1ms on->off when control key pressed

Note: all of alarm and Notice can be displayed on the LCD

(2)LED

UPS condition	Led display
On battery (no alarm)	● ● ○○
On line mode(no alarm)	● ○○○
On bypass mode(no alarm)	● ○● ○
On battery (alarm)	● ● ○●
On line mode(alarm)	● ○○●
On bypass mode(alarm)	● ○● ●
On line mode(Notice)	★○○○

Note: ● : led is on; ○: led is off; ★: led is flashing

(3)KEY

Esc: return back to the upper menu level on the display without executing a command or changing a setting

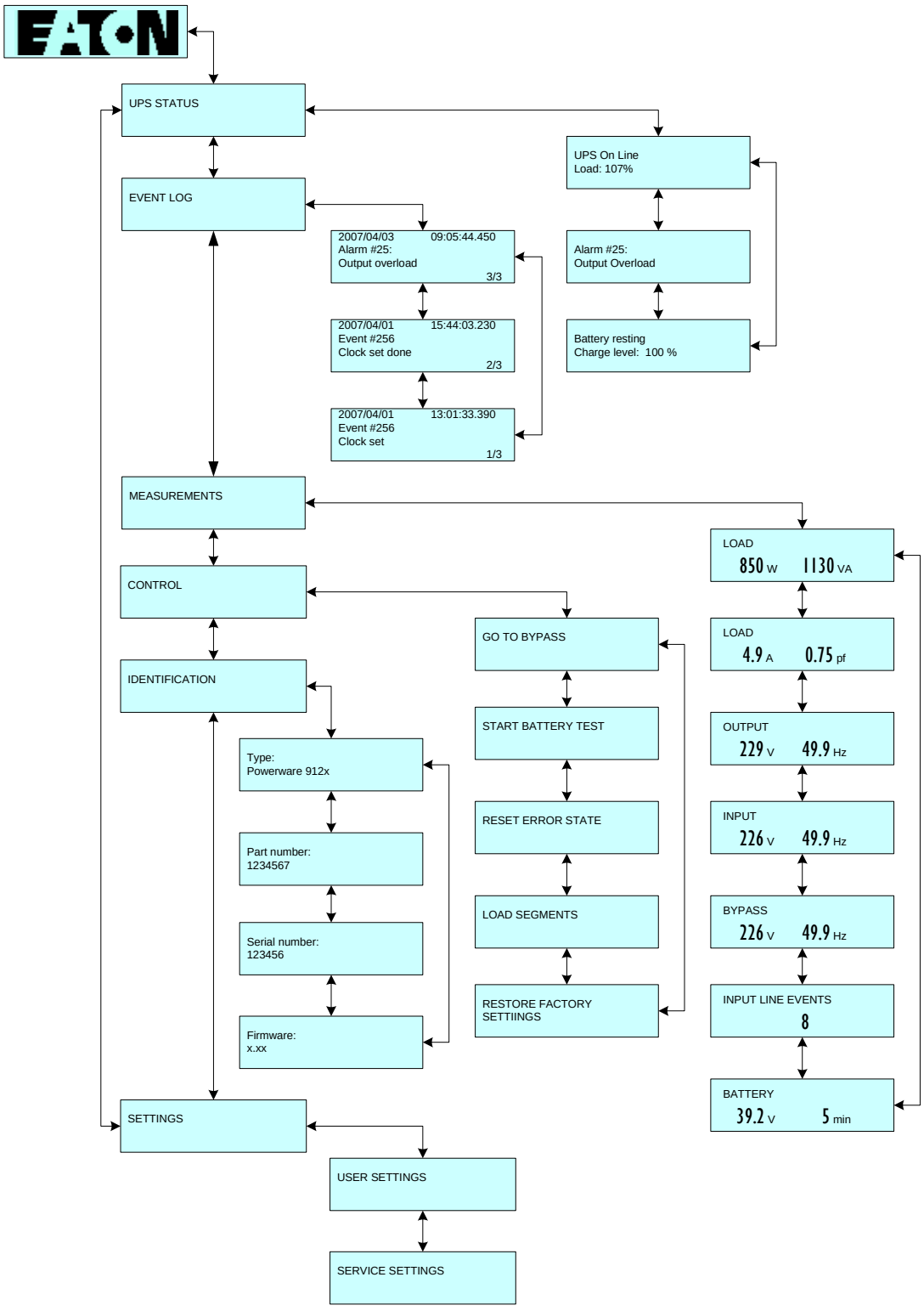
Up: go to the previous screen on this menu level

Down: go to the next screen on this menu level

Enter: go to the lower menu level, execute a command, select a setting to be changed, or set a new setting value

On/off：Output of the unit can be controlled on and off by a dedicated front panel push button

(4)LCD display


UPS STATUS
EVENT LOG
MEASUREMENTS
CONTROL
IDENTIFICATION
SETTINGS
USER SETTINGS
SERVICE SETTINGS
UPS On Line
Load: 107%
Alarm #25:
Output Overload
Battery resting
Charge level: 100 %
2007/04/03 09:05:44.450
Alarm #25:
Output overload
3/3
2007/04/01 15:44:03.230
Event #256
Clock set done
2/3
2007/04/01 13:01:33.390
Event #256
Clock set
1/3
Type:
Powerware 912x
Part number:
1234567
Serial number:
123456
Firmware:
x.xx
GO TO BYPASS
START BATTERY TEST
RESET ERROR STATE
LOAD SEGMENTS
RESTORE FACTORY
SETTIINGS
LOAD
850 W 1130 VA
LOAD
4.9 A 0.75 pf
OUTPUT
229 V 49.9 Hz
INPUT
226 V 49.9 Hz
BYPASS
226 V 49.9 Hz
INPUT LINE EVENTS
8
BATTERY
39.2 V 5 min

IV. ALIGNMENTS

PCB	TEST	TEST POINT	TEST AND ADJUSTMENT SEQUENCE	EXPECTED RESULT
PSDR	DC(+) BUS	C8 for 0.7KVA; C14 for /1kVA; C7 for 1.5kVA; C7/C8 for 2K/3KVA Rack model; C8/C9 for 2K/3KVA Tower model;	Connect DVM (DC) to test points and connect UPS to the main, then press "on" switch.	360±5Vdc on line mode,380±5Vdc on battery mode for HV model; 190± 5Vdc on line mode,200±5Vdc on battery mode for LV model;
	DC(-) BUS	C7 for 0.7kVA; C11 for 1kVA; C9 for 1.5kVA; C9/C9A for 2K/3KVA Rack model; C11/C12 for 2K/3KVA Tower model;	Connect DVM (DC) to test points and connect UPS to the main, then press "on" switch.	-360±5Vdc on line mode,-380±5Vdc on battery mode for HV model; -190± 5Vdc on line mode,-200±5Vdc on battery mode for LV model;
CHGR	CHARGER	P5(+),P6(-) for 0.7kVA; P6(+),P9(-) for 1kVA; P6(+),P12(-) for 1.5kVA; P12(+),P13(-) for 2K/3KVA Rack model; P7P12(+),P5P6(-) for 2K/3KVA Tower E/EU/A model P7P10(+),P5P9(-) for 2K/3KVA Tower U model	Connect DVM (DC) to test points and connect UPS to the main(25 ℃ ambient,-3mV/ ℃ /cell).	27.3Vdc for 0.7kVA, 40.95Vdc for 1kVA, 54.6Vdc for 1.5kVA, 81.9Vdc for 2/3kVA
CNTL	Current balance	#O/P line #O/P neutral	1.Connect test circuit as figure III-1. 2. Connect DVM (DC) to test points and connect UPS to the main, then press "on"	

			switch. 3.Disconnect the UPS to the main, inv. LED is light and bypass LED is off. The buzzer will beep for every 4 seconds. 4.Record the average value during 10 seconds.	±100mVdc

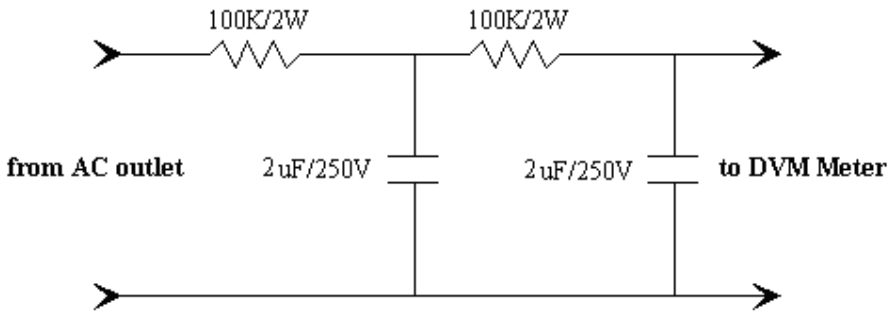


Figure III-1 : Circuit for test output balance

V. TROUBLE SHOOTING

For the reason of safety, you must disconnect UPS to the mains and disconnect battery connector. Check the components listed below to confirm which block is out of order and follow the procedures listed on the following pages to repair them.

CAUTION:

DO NOT supply UPS with the mains unless you are sure that you have replaced all defective components.

1.OVERVIEW :

Circuit Block	Components to be checked	Fail condition
FUSE	F1,F2,F3 for 0.7/1/1.5kVA F2, F3, F4, F5 for 2K3KVA Rack U model F1, F2, F3 for 2K3KVA Rack E/EU/A model F1,F2,F3,F4 for 2K/3KVA Tower model	open
PFC	Q5 for 0.7/1K Q2 for 1.5kVA Q1 for 2/3KVA Rack E/EU/A model Q1 for 2KVA Rack U model Q1,Q2 for 3KVA Rack U model Q1 for 2/3KVA Tower E/EU/A model Q15 for 2KVA Rack U model Q2,Q15 for 3KVA Rack U model	C-E short or open
	D1,D10,REC1 for 0.7/1K D1,D2,REC1 for 1.5K D1, D2, REC1 for 2K/3KVA Rack model D38, D39, REC2 for 2K/3KVA Tower model	short or open
DC/DC	Q7,Q8,Q3,Q11 for 0.7kVA; Q2,Q3,Q4,Q7 for 1kVA, Q3,Q4,Q5,Q6 for 1.5kVA, Q3,Q4,Q5,Q6,Q7,Q8 for 2/3KVA Rack E/EU/A model Q5,Q6,Q7,Q8,Q9,Q13 for 2/3KVA Rack U model Q11,Q12,Q13,Q14,Q24,Q25 for 2/3KVA Tower model	D-S short or open

Inverter IGBT	Q16,Q20 for 0.7/1kVA Q9,Q10 for 1.5kVA, Q09,Q10,Q11,Q12 for 2/3KVA Rack model Q5,Q6,Q7,Q8 for 2/3KVA Tower model	C-E short or open

2.POWER FACTOR CORRECTION:

Step	Checked components	*Instrument function	Reference Value	Failed condition
1	F1 for 0.7/1/1.5kVA, F4, F5 for 2K3KVA Rack U model; F1 for 2K3KVA Rack E/EU/A model; F1,F2 for 2K/3KVA Tower model;	Ω	short	open
2	Q5 for 0.7/1kVA, Q2 for 1.5/VA, Q1 for 2/3KVA Rack E/EU/A model Q1 for 2KVA Rack U model Q1,Q2 for 3KVA Rack U model Q1 for 2/3KVA Tower E/EU/A model Q15 for 2KVA Rack U model Q2,Q15 for 3KVA Rack U model	(C,E) : DIODE (G,E) : Ω	0.5V 47KΩ	short or open short or open or value change
3	D1,D10 for 0.7/1K D1,D2 for 1.5K D1, D2 for 2K/3KVA Rack model D38, D39 for 2K/3KVA Tower model	DIODE	0.5V	short or open
4	R47 for 0.7/1K R9 for 1.5K R9 for 2/3KVA Rack E/EU/A model R9 for 2KVA Rack U model R9,R11 for 3KVA Rack U model R118 for 2/3KVA Tower	Ω Ω	47Ω 100Ω	open or value change

	E/EU/A model R26 for 2KVA Rack U model R26,R118 for 3KVA Rack U model	Ω Ω	47Ω 62Ω	
5	REC1 REC1 for 2K/3KVA Rack model REC2 for 2K/3K VA Tower model	DIODE	0.5V	short or open

3.DC-DC CONVERTER:

Step	Checked components	*Instrument function	Reference Value	Failed condition
1	F2, F3 for 0.7/1/1.5kVA, F2, F3 for 2K3KVA Rack model F3,F4 for 2K/3KVA Tower model	Ω	short	open
2	Q7,Q8,Q3,Q11 for0.7kVA Q2,Q3,Q4,Q7 for 1kVA Q3,Q4,Q5,Q6 for 1.5kVA Q3,Q4,Q5,Q6,Q7,Q8 for 2/3KVA Rack E/EU/A model Q5,Q6,Q7,Q8,Q9,Q13 for 2/3KVA Rack U model Q11,Q12,Q13,Q14,Q24, Q25 for 2/3KVA Tower model	(D,S): DIODE (G,S): Ω	0.5V 23KΩ for 0.7/ 1/1.5/2kVA 15.7KΩ for 3 kVA	short or open

* The instrument is D.M.M. (digital multi-meter).

4.DC/AC INVERTER:

Step	Checked components	*Instrument function	Reference Value	Failed condition
1	Q16,Q20 for 0.7/1kVA Q9,Q10 for 1.5kVA, Q09,Q10,Q11,Q12 for 2/3KVA Rack model	(C,E): DIODE (G,E): Ω	0.5V 47KΩ for 0.7/1/1.5/2kVA,	short or open short or open or value change

	Q5,Q6,Q7,Q8 for 2/3KVA Tower model		23KΩ for 3kVA	
2	R112,R113 for 0.7kVA, R112,R113 for 1kVA, R45,R52 for 1.5kVA, R55,R60 for 0.7kVA, R55,R60 for 1kVA, R44,R51 for 1.5kVA, R49,R56 for 2K Rack U model; R51,R54 for 2K Rack U model; R47,R49,R56,R69 for 3K Rack U model; R45,R51,R52,R54 for 3K Rack U model; R45,R49,R52,R56 for 2K Rack E/EU/A model; R44,R47,R57,R54 for 2K Rack E/EU/A model; R45,R49,R52,R56 for 3K Rack E/EU/A model; R44,R47,R57,R54 for 3K Rack E/EU/A model; R30,R36 for 2K Tower U model; R37,R153 for 2K Tower U model; R30,R32,R36,R39 for 3K Rack U model; R33,R37,R40,R153 for 3K Rack U model; R30,R32,R36,R39 for 2K Tower U model; R33,R37,R40,R153 for 2K Tower U model; R30,R32,R36,R39 for 3K Rack U model; R33,R37,R40,R153 for 3K Rack U model;	Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω Ω	10Ω 22Ω 10Ω 27Ω 27Ω 47Ω 39Ω 51Ω 39Ω 51Ω 22Ω 27Ω 22Ω 27Ω 22Ω 27Ω 39Ω 51Ω 22Ω 27Ω	value change or open

		Ω Ω	22Ω 27Ω	

5.CONTROL POWER SUPPLY :

Step	Checked components	*Instrument function	Reference Value	Failed condition
1	Q201(D,S)	DIODE	0.5V	short or open
2	R208	Ω	50KΩ	short or open or value change
3	R206	Ω	23	Open or change
4	U201 (3845) PIN 5-6 5-7 5-8 6-8	Ω	Around 50kΩ >1M 3.5k Around 55kΩ	too low

6.CHARGER:

Step	Components	*Instrument function	Reference Value	Failed condition
1	FU601 F1 (2K/3KVA)	Ω	short	open
2	Q2 Q4(2K/3KVA Tower E/EU/A model); Q1(2K/3KVA Tower U model); Q2(2K/3K Rack E/EU/A model); Q4(2K/3K Rack U model); (S,D) (D,S) (G,S)	 DIODE DIODE Ω	 0.5V ≒ ∞ 50KΩ	 Short or open Short short or open or value change
3	D15,D18 ,D20	DIODE	0.5V	Short or open

	D4,D5,REC1(2K/3KVA Tower E/EU/A model); D3,D4,REC1 (2K/3KVA Tower U model); D15,D18,REC1(2K/3K Rack E/EU/A model); D3,D4,REC1(2K/3K Rack U model);			

7.DYNAMIC CHECK:

When all main components have been replaced, put PSDR board back and fix it then plug all connectors back. Check if all connectors and terminals are on correct location.

(1) Disconnect battery jumper on battery.

(2) Connect the UPS to the mains. Use oscilloscope to see those points:

(a) Voltage between C41(for 1.5k/2K/3KVA),C30(for 0.7/1kVA) is 5Vdc. If not, check U2 (for 1.5k/2K/3KVA), U6(for 0.7/1kVA)'s pin "I", "O" if it is short. If it yes, replace it.

(b) Voltage between C38(for 1.5kVA,2K/3KVA Rack),C32(for 0.7/1kVA),C7(for 2K/3KVA Tower)is 12.0Vdc. If the waveform abnormal, then recheck PART V.

(c) Voltage between C9(for 0.7/1kVA), C14(for 1.5kVA), C40(for 2/3kVA Tower),C35(for 2K/3KVA Rack) is -8~-15Vdc.If the waveform abnormal, then recheck PART V.

Before probe following points must be very careful don't make any short with not-related parts, otherwise may cause serious damage.

(d) Use roll function of oscilloscope to inspect the voltage of CN8's pin 9 to pin 10, then push the "on" switch of front panel. The buzzer would beep and display "Batt disconnect" composite signals. If its waveform is a series of PWM waveform with Vpeak 15~18V, Vvalley -6.5 ~ -8.5V. That's expected normally. Just push "off" switch. If the waveform is abnormal, then replace CN8.

(e) Inspect the voltage of CN6&CN7's pin 9 to pin 10 following the same step as "d". If the waveform is abnormal, then replace CN6&CN7.

(f) Inspect the voltage of Q3 (G,S of DC/DC MOSFET) follow the same step as "e", but the waveform is 0Vdc then appear suddenly a group of PWM wave Vpeak 12V. If the waveform is abnormal, then recheck point 3 of PART V.

(g) Inspect the voltage of Q6 (G,S of DC/DC MOSFET) follow the same step as

"f". If the waveform abnormal, then recheck point 3 of PART V.

(3) Disconnect the UPS to the main, then connect battery jumper. connect the UPS to the main again. Press the “ON” switch, wait the LED indicator transfer to INV mode. Check DC (±) BUS voltage = ±350(±5) Vdc at 220Vac, ±360(±5) Vdc at 230Vac, ±370(±5) Vdc at 240Vac. If the voltage is not boosted, then recheck point 2 of PART V.

(4) Disconnect the UPS to the main and UPS will transfer to backup mode if it is normal. If not, recheck point 3 of PART V.

(5) If points 1~5 are all correct, machine would be in well repaired.

VI. APPENDIX I : COMMUNICATION

1. RS232

The RS232 provides proprietary command sequence for the computer to monitor the line and UPS status and to control the UPS. The data format is listed as following:

PIN TYPE .....: male
BAUD RATE ..... : 9600 bps
DATA LENGTH ..... : 8 bits
STOP BIT ..... : 1 bit
PARITY ..... : NONE

The pin assignment and description are listed in the following table and the interface configuration is indicated in **Figure VI-1**. UPS data will be provided at 9600 baud rate and consist of 8 data bits, 1 stop bit, and no parity bit. All the information is provided in ASCII format.

PIN #	Description	I/O type
4	Not connected	N/A
2	UPS RS232 receiver RX from computer.	Input
3	UPS RS232 transmitter to computer	Output
5	GND	N/A
1	Battery low	Output
6	Not connected	N/A
7	Not connected	N/A
8	AC fail	Output
9	DC Power +12V	Output

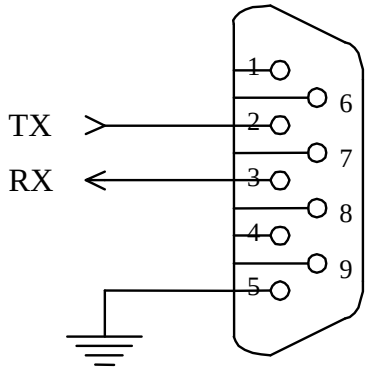
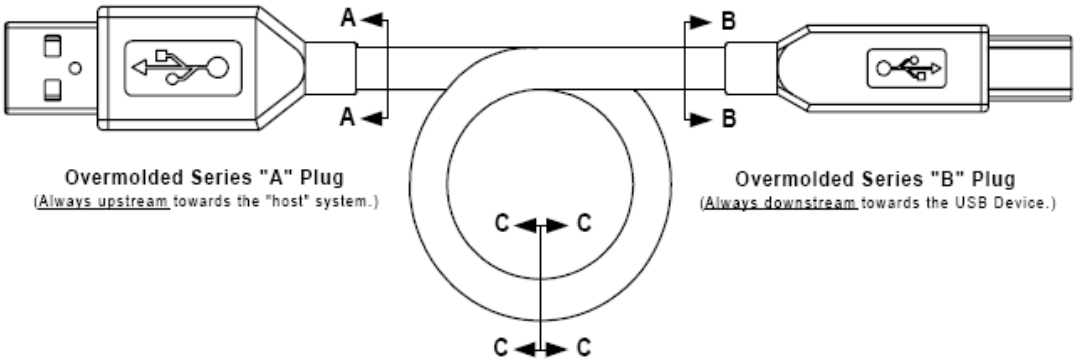


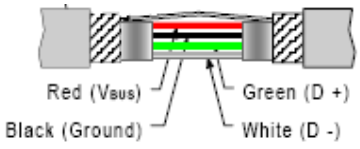
Figure VI-1 : RS232 connection

2. USB

PW 9130 UPS is a low-speed USB device, so it accords to the Universal Serial Bus Specification Rev 1.1.

A detachable USB cable used for communication must be full speed. It consists of a series ‘A’ plug, a series ‘B’ plug, two data line lines (D+ and D-), a ground line and a VBUS line. See the following pictures.



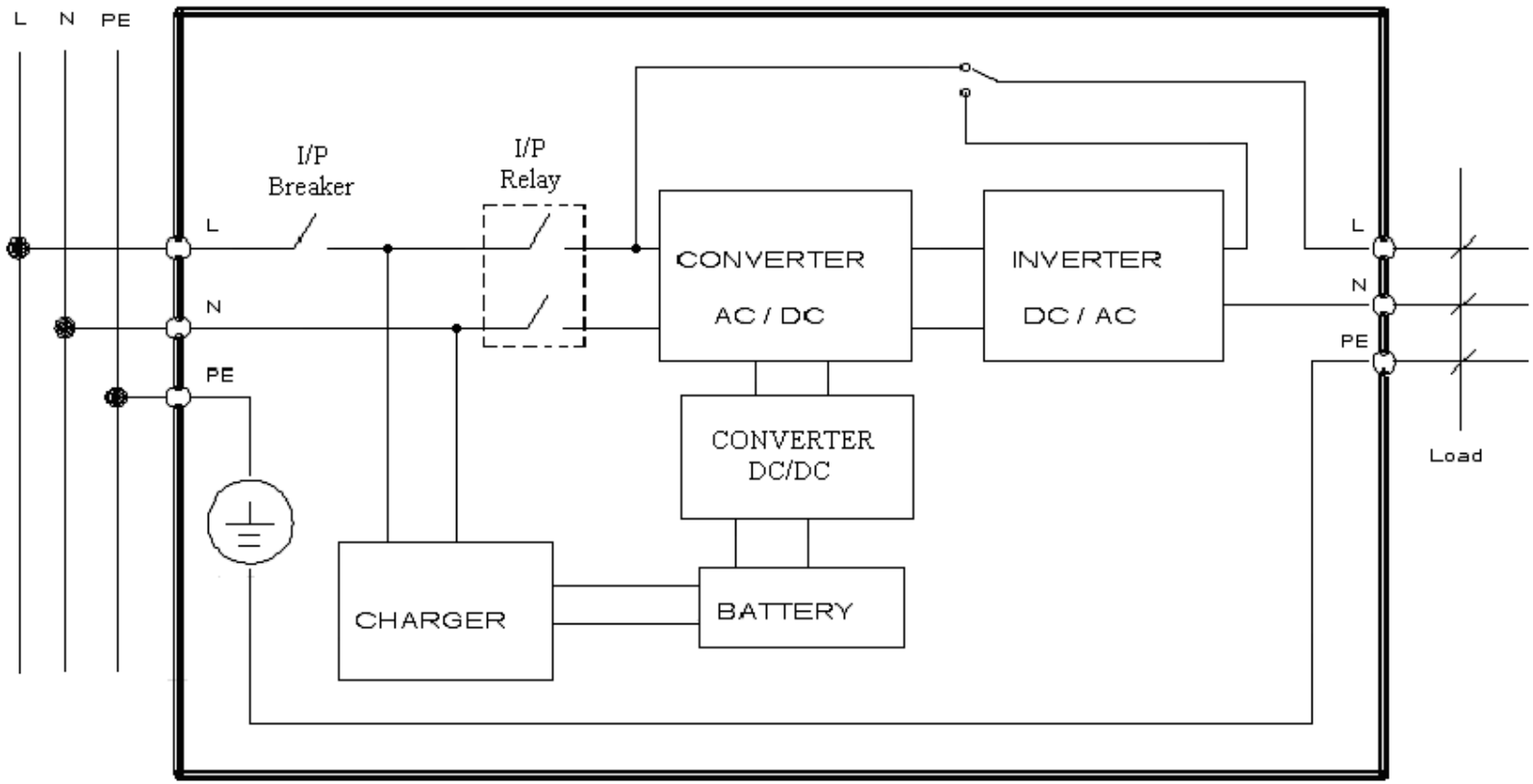


3. SNMP CARD

The Connector is a 26-pin Board Connector.

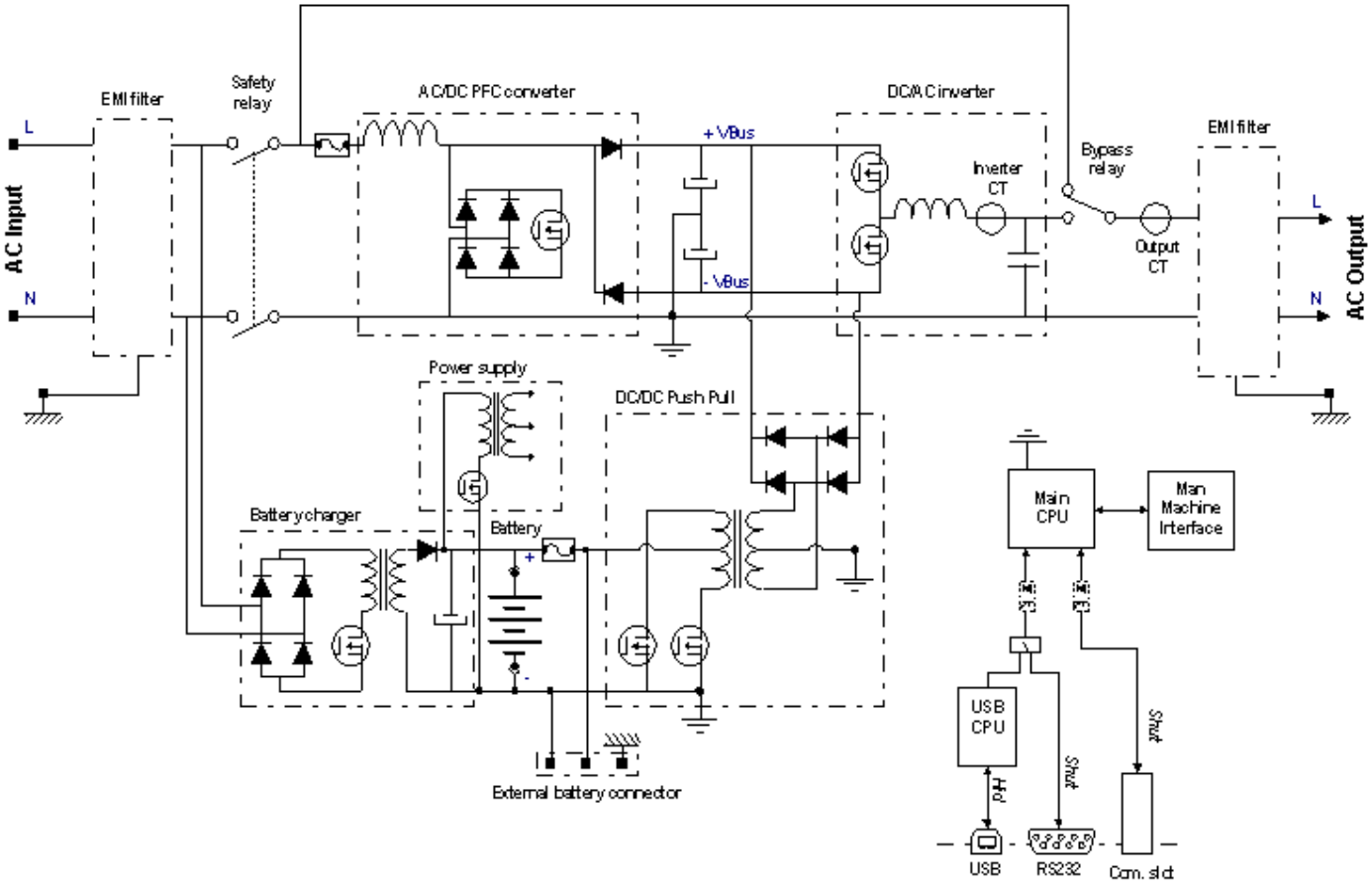
The Pin Connector layout is as Follows

Pin	description	**proposed ctrl board signal**	**option that uses the pin**
1	Ground (common for pins 1-10)	GND-S	SNMP/Web Adapter Relay / AS400 Card
2	Plug-in Card power; +12 VDC (same spec as for 9120)	+VCC	SNMP/Web Adapter
3	RS232 receive function: UPS RxD from Plug-in Card (output from card) at RS232 serial levels, 9600 bps, 8 data, no parity, 1 stop bit Signal input functionality: If this pin receives a RS-232 Low (+VDC signal) for at least 5 seconds, the UPS executes a function selected by the setting “signal inputs”	RxD1	SNMP/Web Adapter Relay / AS400 Card
4	UPS TXD to Plug-in Card (input to card) at RS232 serial levels, 9600 bps, 8 data, no parity, 1 stop bit	TxD1	SNMP/Web Adapter
5	Unused	-	N/C
6	Unused	-	N/C
7	Unused	-	N/C
8	Unused	-	N/C
9	Ground (common for pin 1-10)	GND-S	SNMP/Web Adapter
10	+12 VDC (SNMP power), tied in parallel to pin 2	+VCC	SNMP/Web Adapter Relay / AS400 Card
11	Reserved	-	N/C
12	Reserved	-	N/C
13	Reserved	-	N/C
14	Reserved	-	N/C
15	Reserved	-	N/C
16	Reserved	-	N/C
17	Unused	-	N/C
18	Shutdown in any mode (remote shutdown by default), active low (configurable input to UPS)	Re5	Relay / AS400 Card
19	Summary alarm signal (configurable), active high (output from UPS)	Re2	Relay / AS400 Card
20	On bypass signal (configurable), active high (output from UPS)	Re4	Relay / AS400 Card
21	Line fail / on battery signal (configurable), active high (output from UPS)	Re3	Relay / AS400 Card
22	Unused	-	N/C
23	Common for pins 17-26		Relay / AS400 Card
24	Low battery signal (configurable), active high (output from UPS)	UPS DE	Relay / AS400 Card
25	Unused	-	N/C
26	+12 VDC, separate from pins 2 and 10	+12V	Relay / AS400 Card



BLOCK DIAGRAM

Figure 1



Block diagram

Figure 2

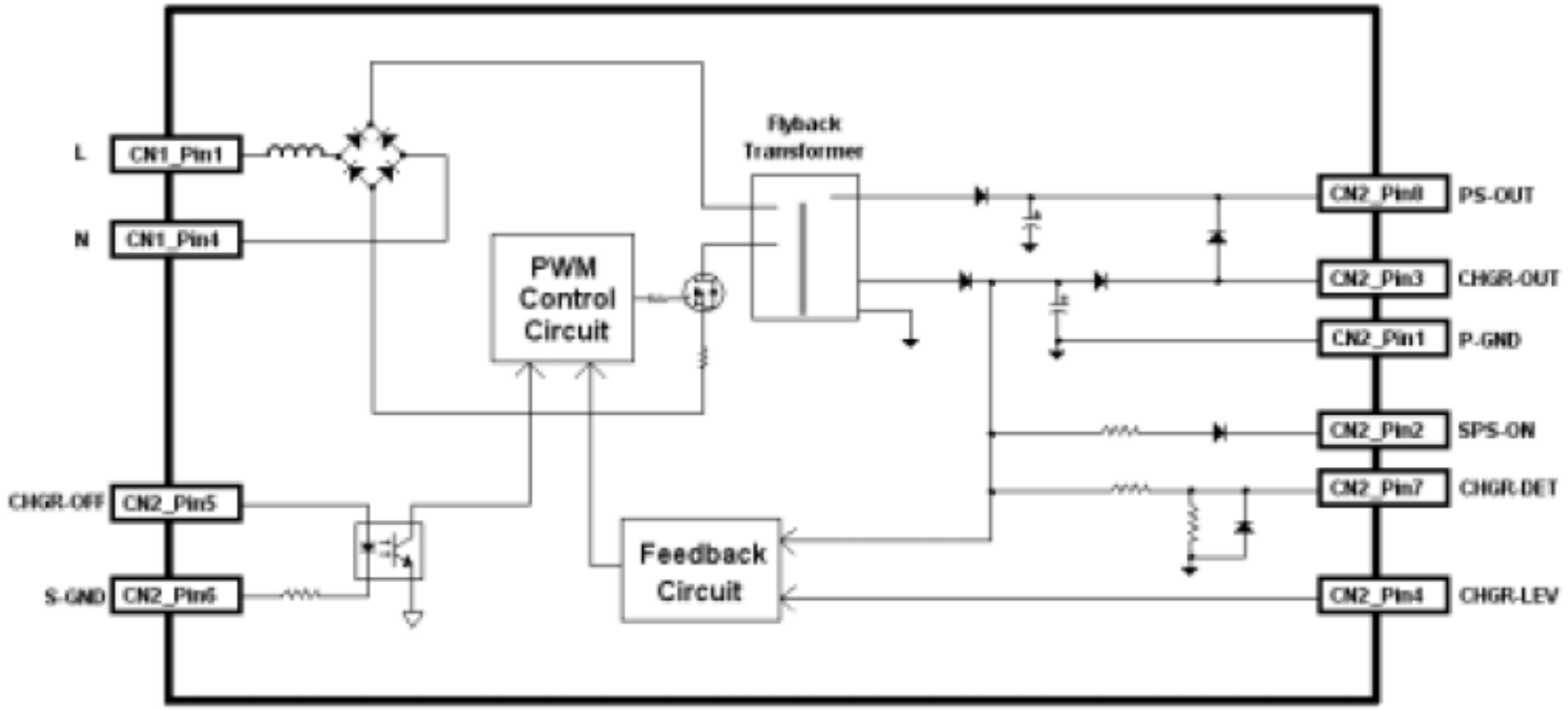


Figure 3 CHGR BLOCK DIAGRAM

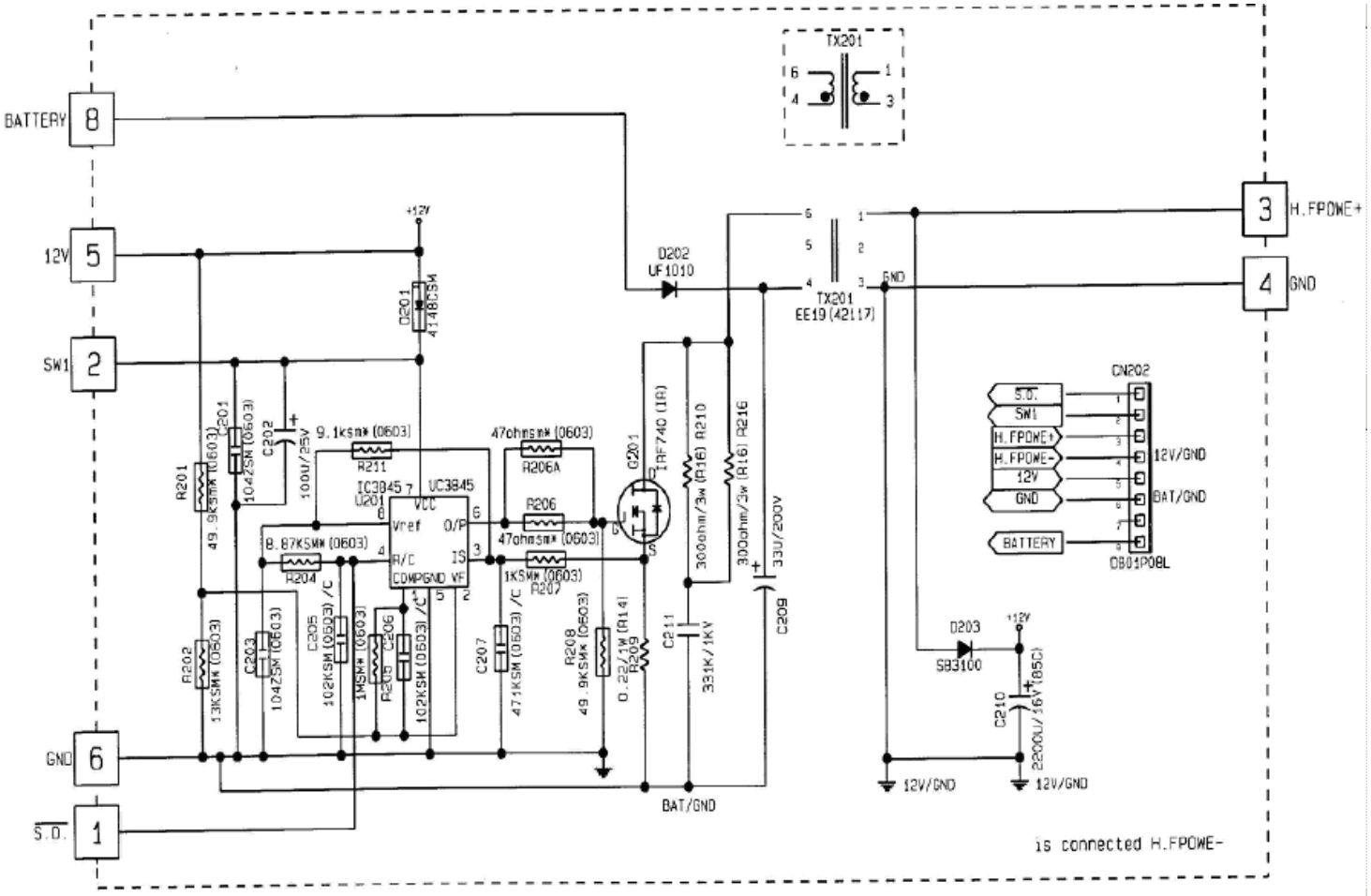


Figure 4 Power supply block diagram

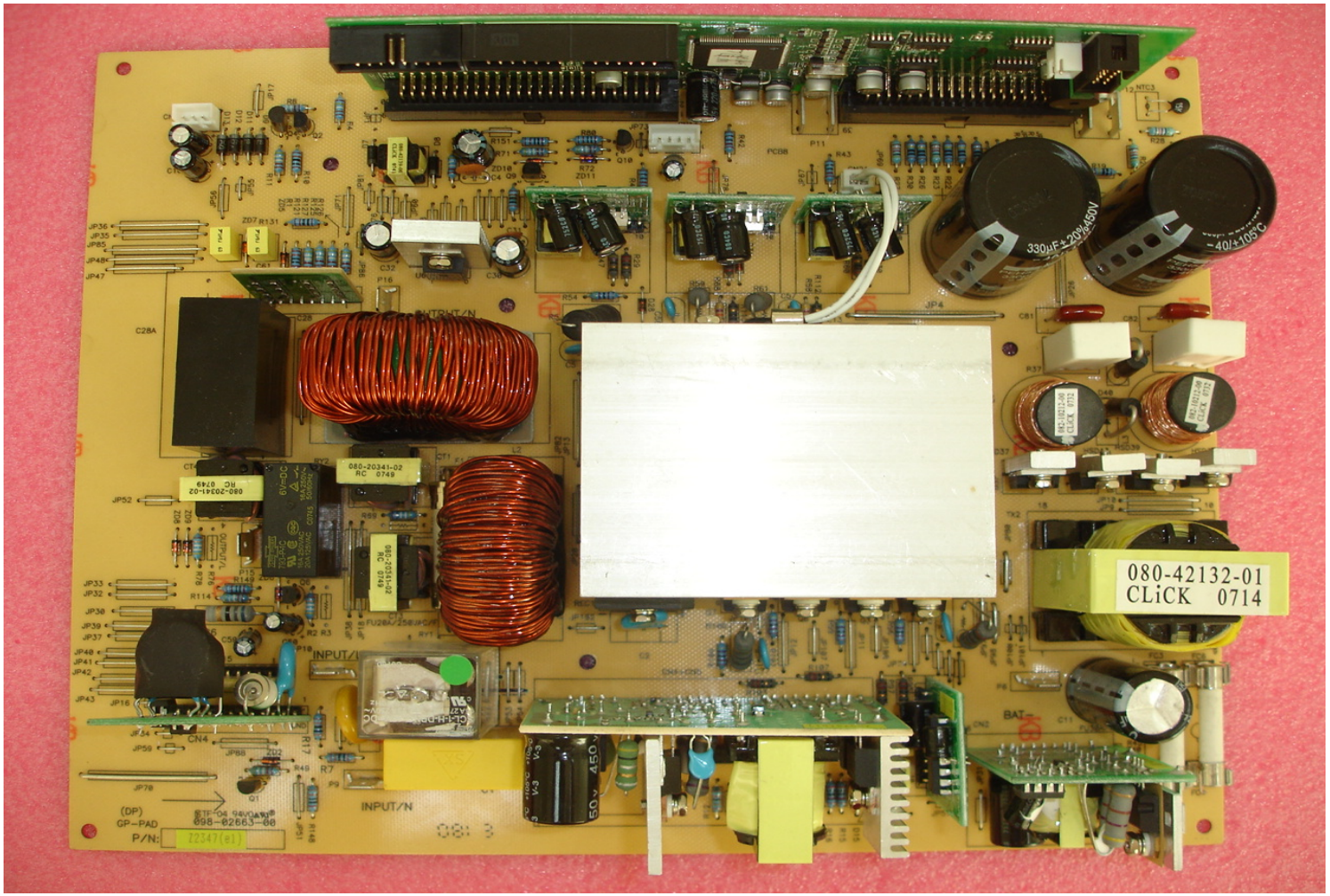

330µF±20%450V
-40/+105°C
080-42132-01
CLiCK 0714
INPUT/N
(DP)
GP-PAD
P/N:

Figure 5 0.7K PSDR

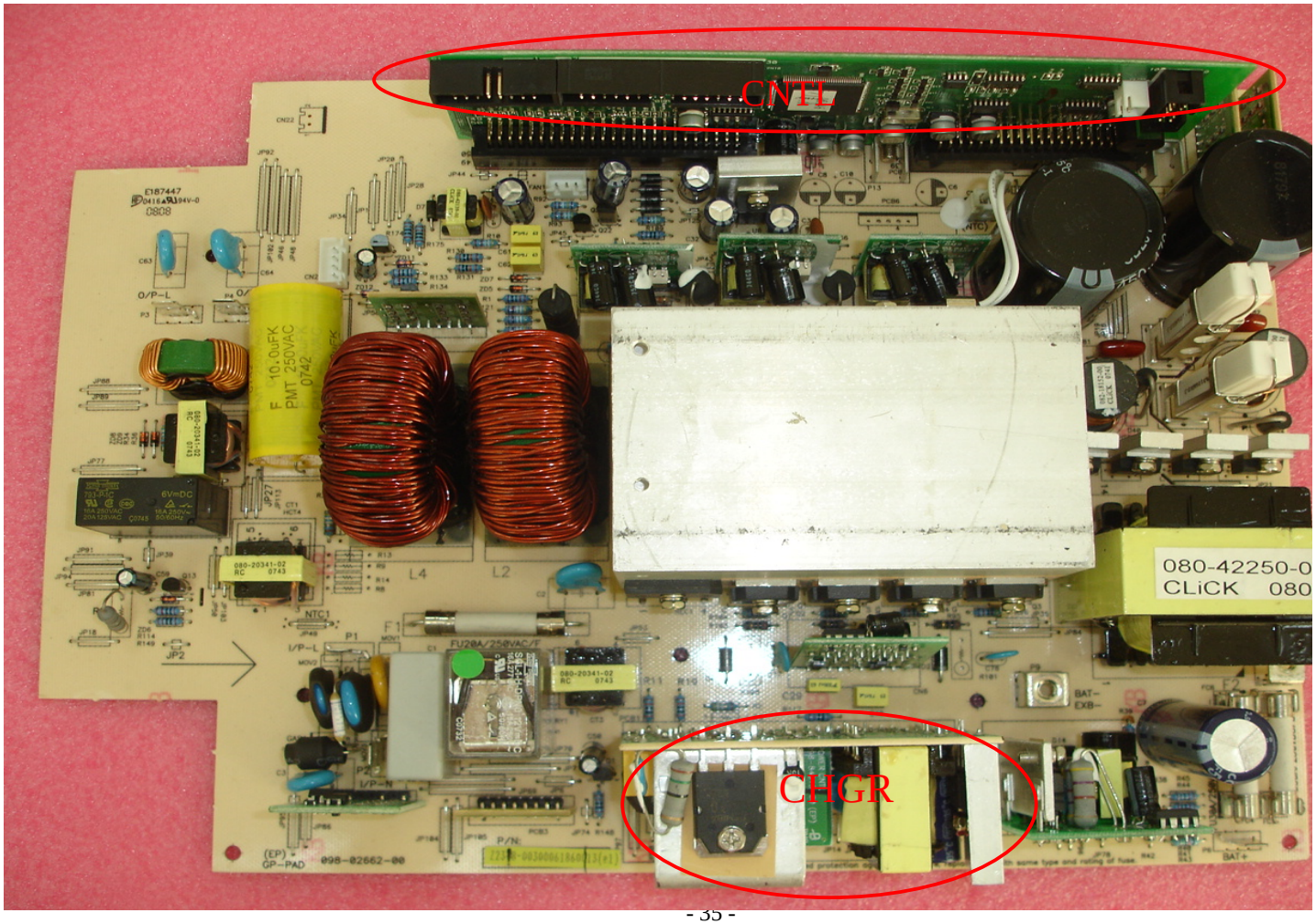
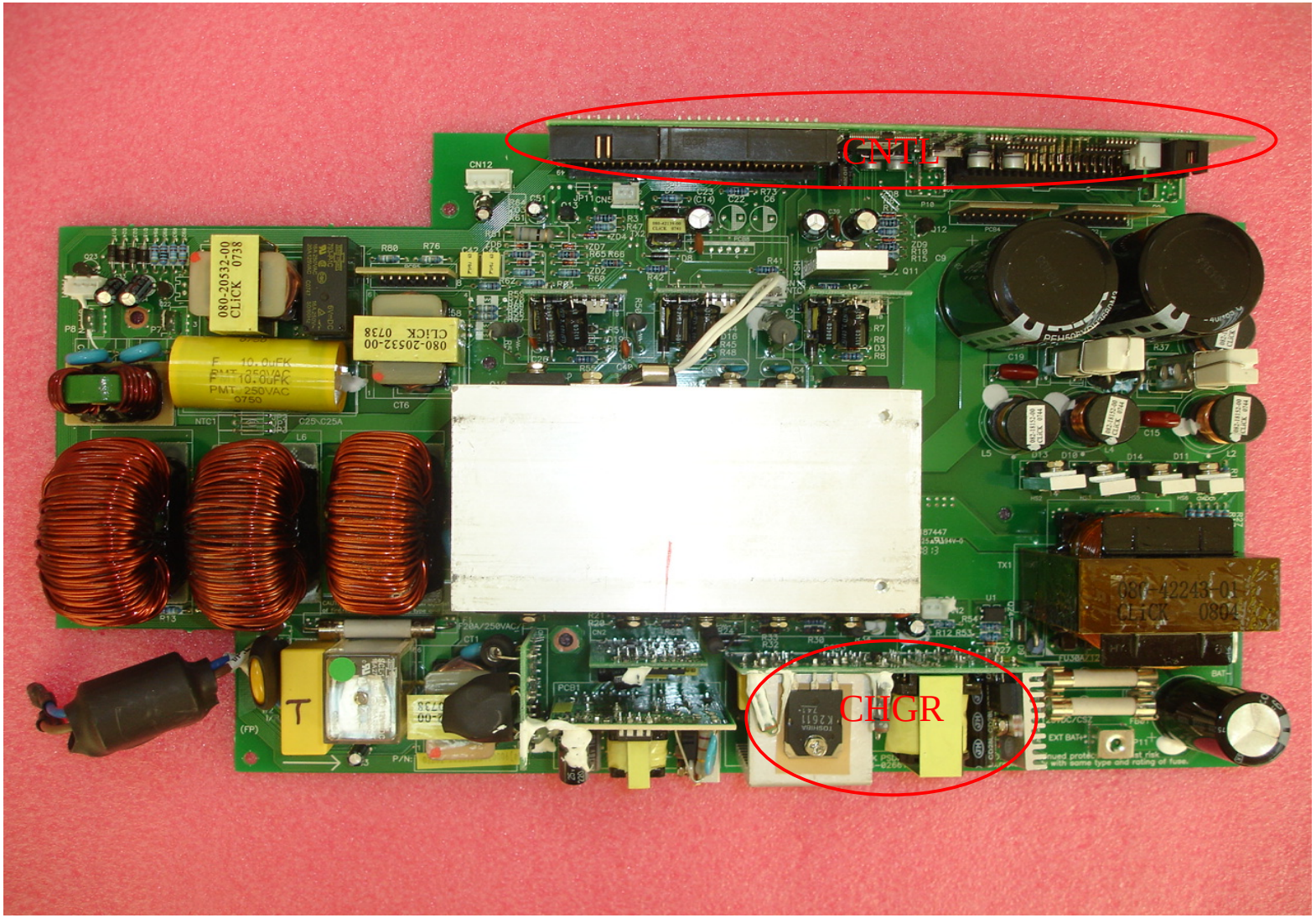


Figure 6 1K PSDR



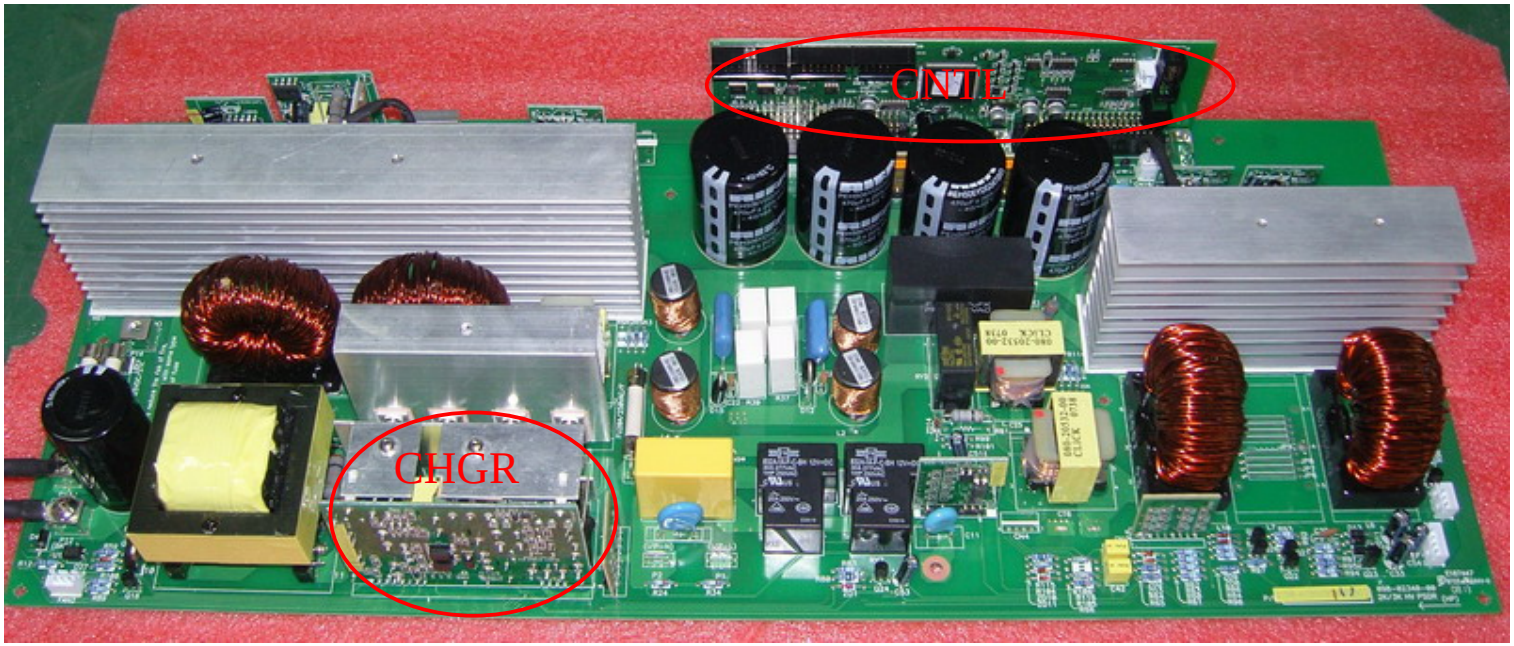


Figure 8 2K/3K Rack E/EU/A model PSDR

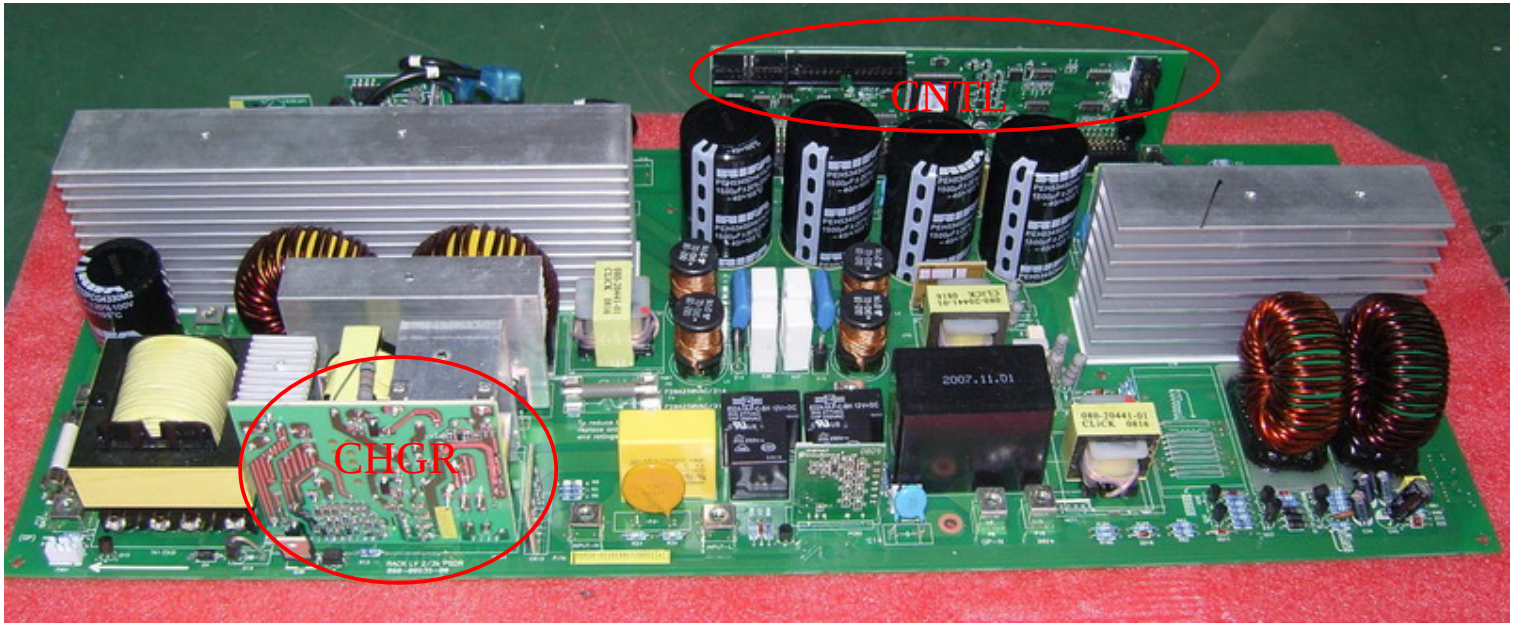


Figure 9 2K/3K Rack U model PSDR

Powerware 9130 Event/Notice/Alarm texts

Event number	Description
alarm levels	Event Notice Alarm
Notice #0	Inverter AC over voltage
Notice #1	Inverter AC under voltage
Notice #3	Bypass AC over voltage
Notice #4	Bypass AC under voltage
Notice #5	Bypass under or over frequency
Notice #6	Input AC over voltage
Notice #7	Input AC under voltage
Notice #8	Input under or over frequency
Notice #12	Remote emergency power off
Alarm #19	Building alarm 1
Alarm #25	Output overload
Alarm #27	Inverter output over current
Notice #28	DC link over voltage
Notice #29	DC link under voltage
Alarm #30	Rectifier failed
Alarm #31	Inverter fault
Alarm #34	Charge failure
Alarm #41	Inverter Uncalibrated
Alarm #42	DC voltage Uncalibrated
Alarm #53	EEPROM failure

Notice #55	**Shutdown imminent**
Alarm #56	**Battery low**
Notice #57	**Utility failure**
Alarm #58	**Output short circuit**
Notice #59	**Utility not present**
Alarm #68	**Battery DC over voltage**
Alarm #73	**Heatsink overtemperature**
Event #94	**To bypass command**
Event #95	**From bypass command**
Notice #105	**Bypass not available**
Event #139	**Inverter on / off**
Notice #143	**On manual/ maintenance bypass**
Alarm #149	**Battery needs service**
Alarm #159	**Level 2 overload**
Alarm #162	**Level 3 overload**
Alarm #165	**Level 4 overload**
Notice #168	**UPS on battery**
Notice #169	**UPS on bypass**
Event #172	**UPS on command (front panel, serial port)**
Event #173	**UPS off command (front panel, serial port, signal input)**
Alarm #174	**Low battery shutdown**
Event #178	**DC start occurred**
Alarm #191	**Battery test failed (battery support test, open cell voltage), Battery test OK**
Alarm #193	**Fan failure**
Alarm #194	**Site wiring fault**
Alarm #199	**Batteries disconnected**
Alarm #202	**Ambient undertemperature**

Event number	**Description**
Alarm #203	**Ambient overtemperature**
Alarm #211	**Modem failed / OK**
Event #212	**Incoming modem call started**

Event #213	**Outgoing modem call started**
Event #214	**Modem connection established/ended**
Event #216	**Modem call completion failed**
Alarm #224	**Configuration error/ok**
Event #227	**In high efficiency mode**
Event #237	**UPS on normal**
Event #290	**Clock set / Clock set done**
Notice #291	**DC link imbalance**
Event #294	**UPS off**
Alarm #295	**Heatsink overtemperature shutdown**
Alarm #296	**Output overload shutdown**
Notice #297	**Bypass failure shutdown**
Event #298	**ABM charging**
	ABM floating
	ABM resting
	ABM discharging

Watcher SOP

1028793 A

Catalog

I. Watcher 2.0 Function

Watcher 2.0 can be used to monitor/set 912X UPS.
It also can flash DSP firmware with RS232 or USB cable.
For working, it need include three files at least: Watcher.exe, Login.ini, UPSDeviceList.ini.

<Prepare>
For monitor/set 912X UPS:

PC with COM port（OS: Win 2000 or Win XP …）, RS232 cable.

For flash DSP firmware:

PC with COM port（OS: Win 2000 or Win XP …）, RS232 cable.

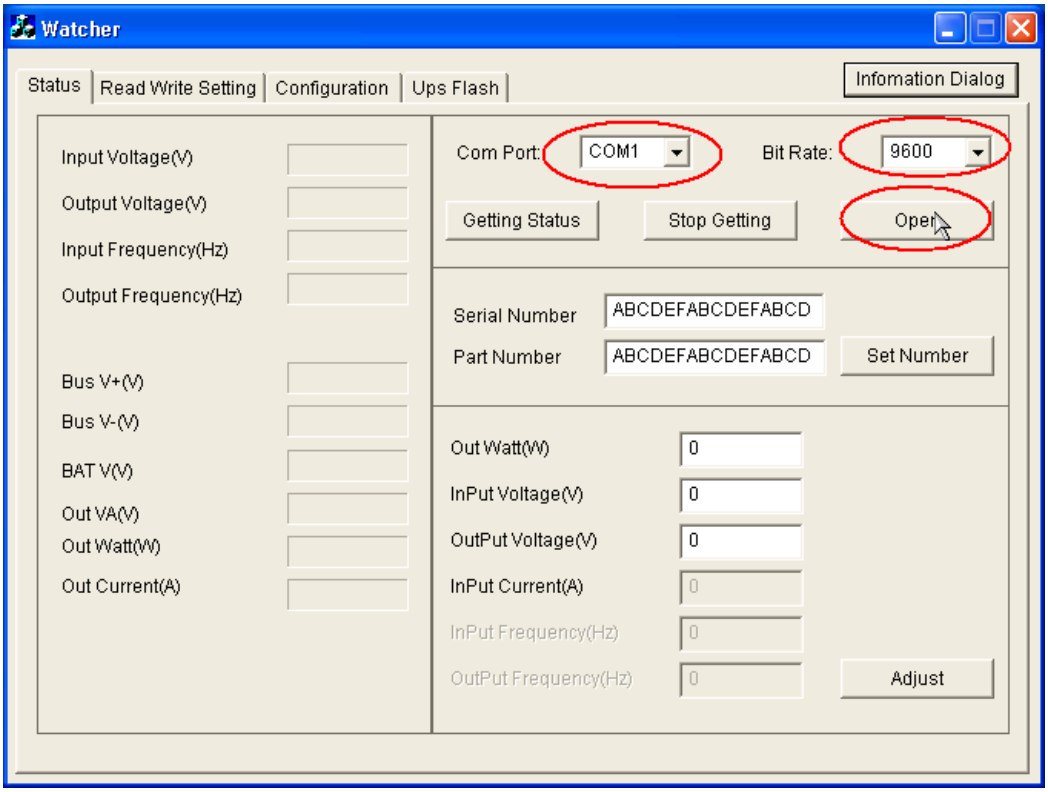
PC with USB port（OS: Win 2000 or Win XP …）, USB cable.

Copy Watcher and other files (like .S file, ini file need to use) to PC.

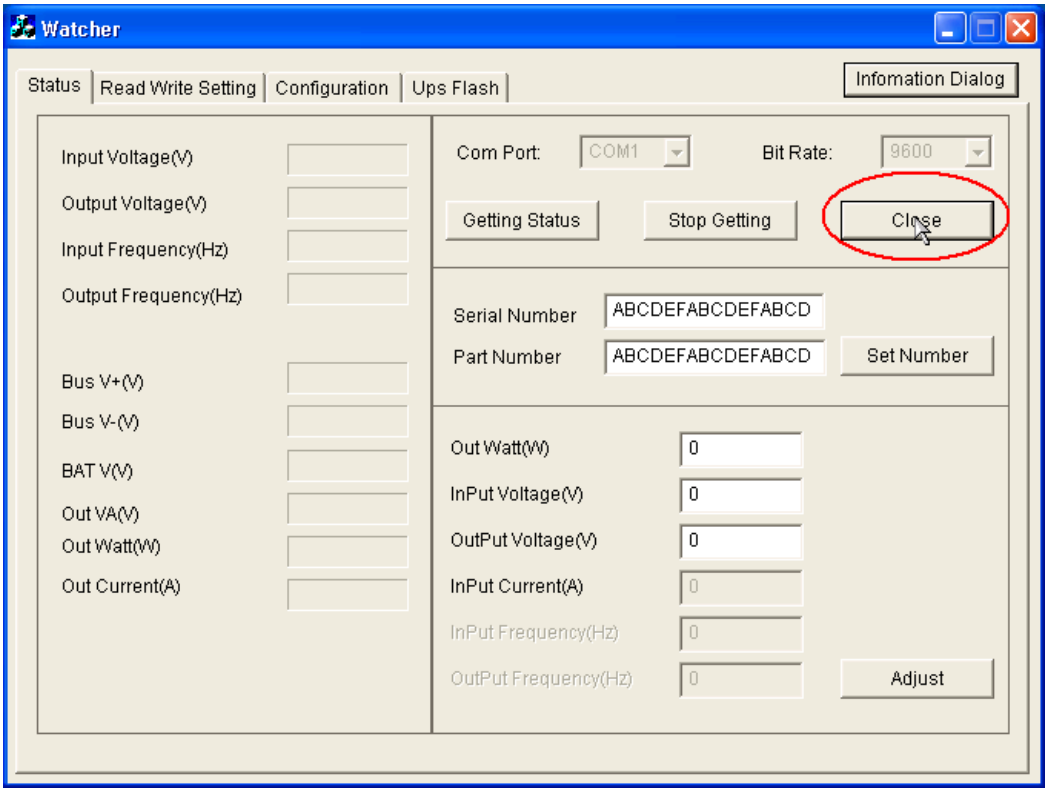
II. UPS status

1. Open Com port

Choose COM port and bit rate, then click “Open” to open the com port by bit rate.



Then the button “Open” will change to be “Close”.

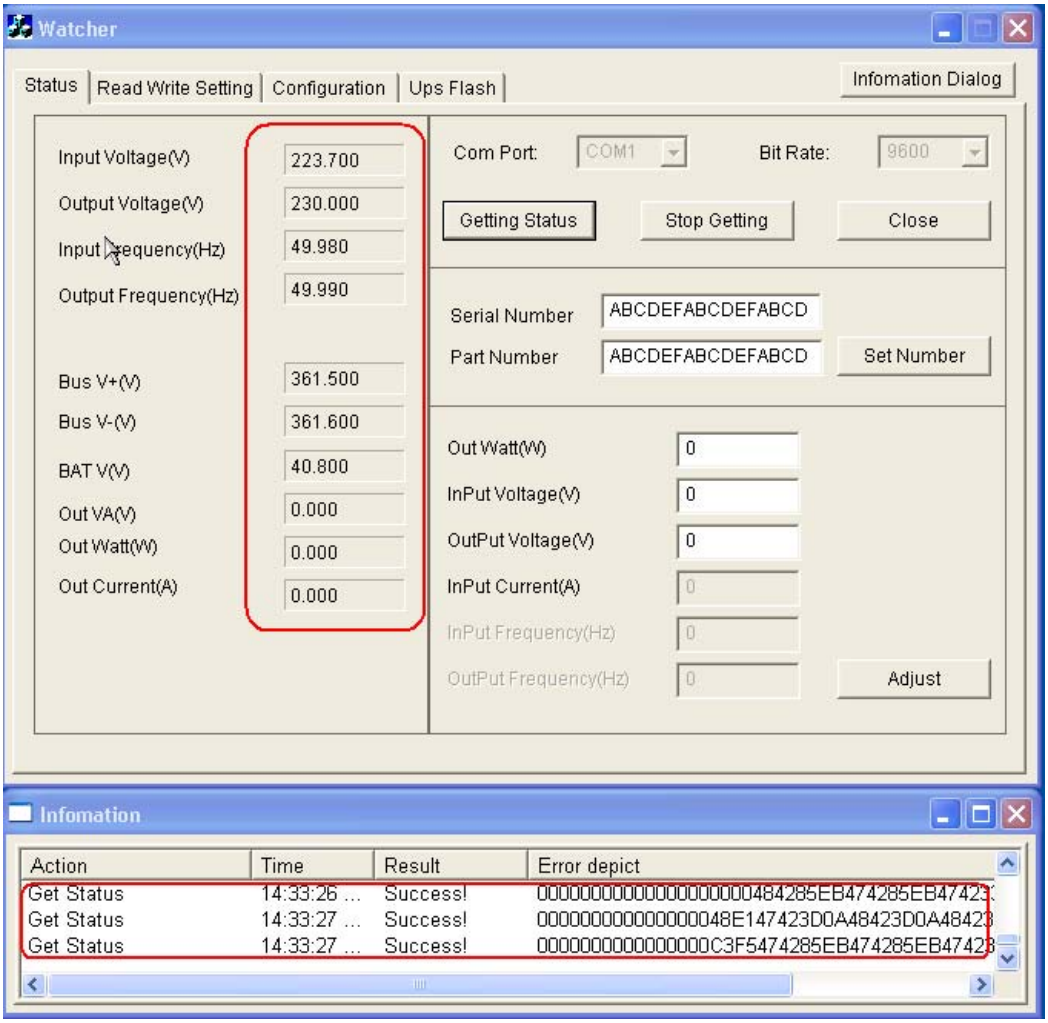


Click the “Close” can close the port, and then disconnect from UPS.

2. Keep getting UPS’s status

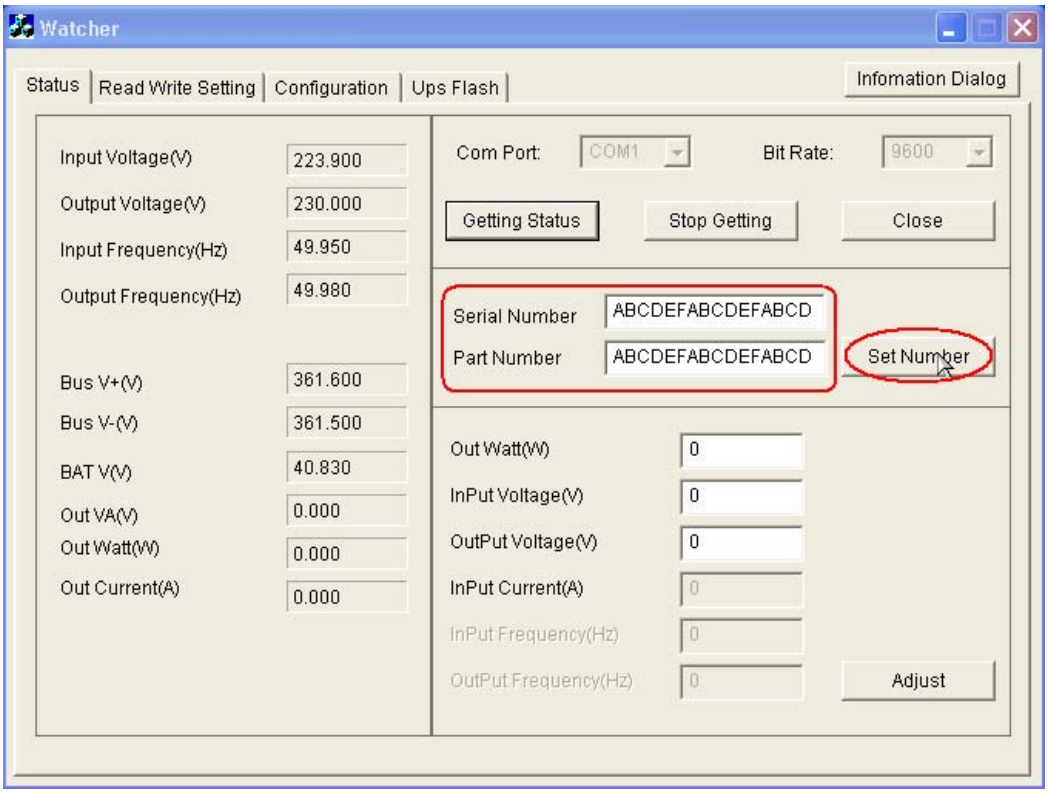
Click “Getting Status” to keep getting UPS’s status, they will be show at left.

Click “Stop Status” to stop get status. If shift the tab, getting status will be stop.



3. Set serial number and part number

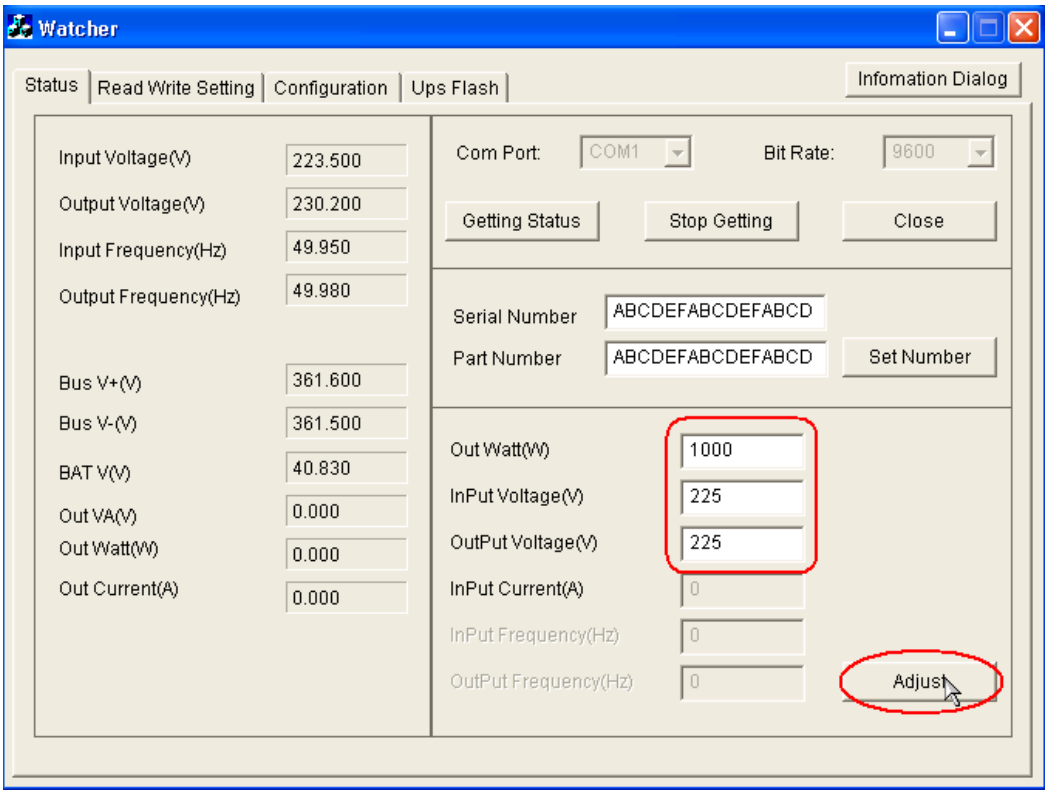
Click “Set number” to set serial number and part number.



Note: serial number and part number must be composite of 0 to 9, A to F, or - , and the length must be 16 or less.

4. Adjust some status

Inputs adjust data at edit box; click “Adjust” to adjust status.



Note:

There have an adjust range, so input a suitable data that near the real data. Other wise, a warning dialog will pop up.

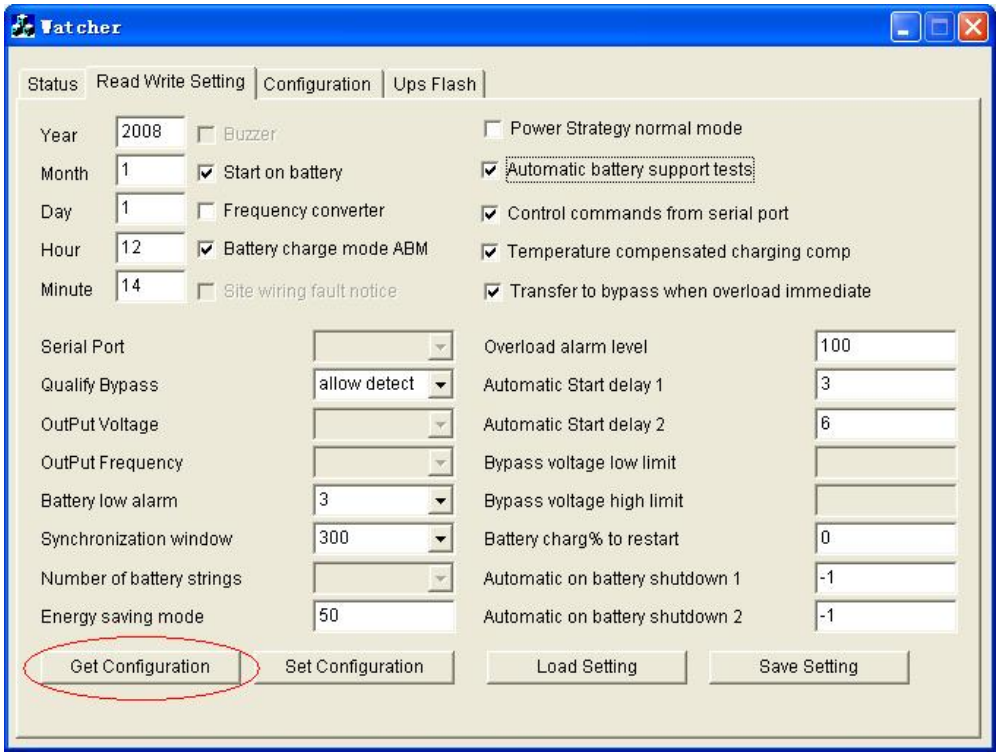
Return to Catalog

III. Read/Write UPS configuration

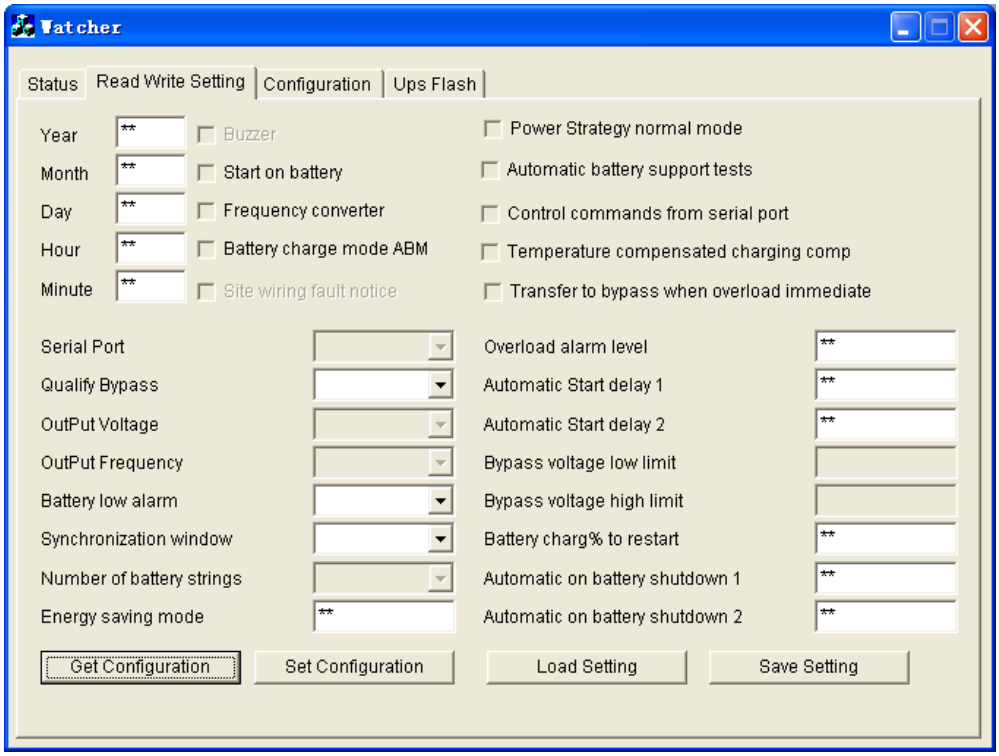
This tab have four functions: get UPS's Real configuration from Rs232, set UPS's Real configuration by Rs232, save configuration to .ini file, and load configuration from .ini file.

1. Get configuration

Click "Get Configuration" to get the real configuration of UPS.

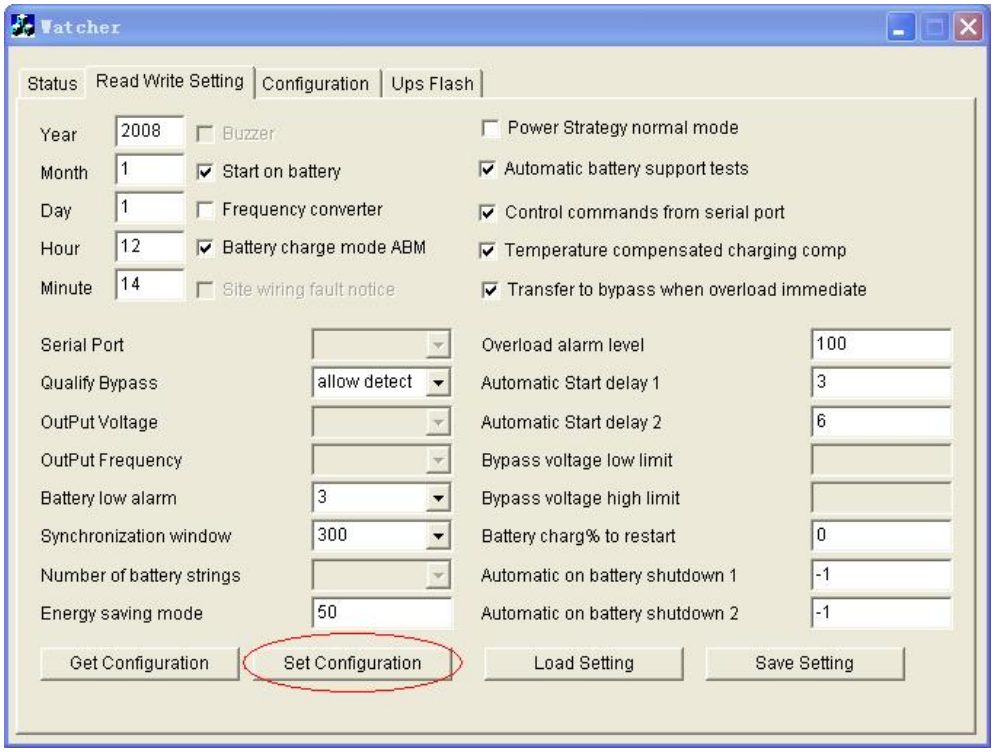


If commutation false or receive data invalid, edit box will be "**", select box will be "", check box will be  .



2. Set configuration

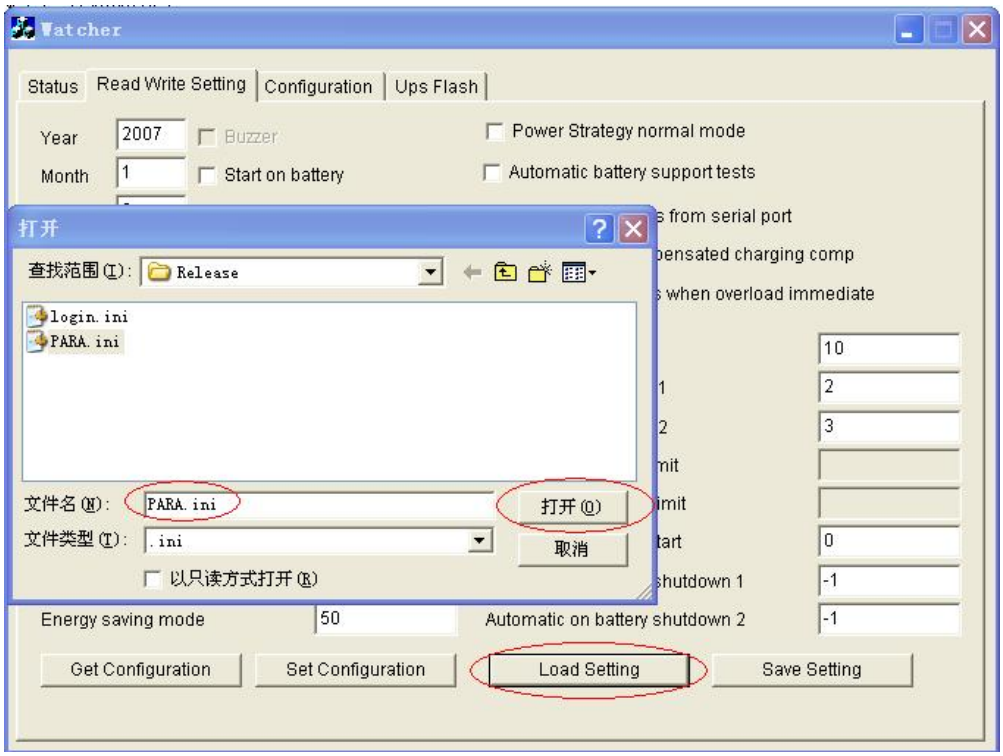
Click “Set Configuration” to set the configuration to UPS.

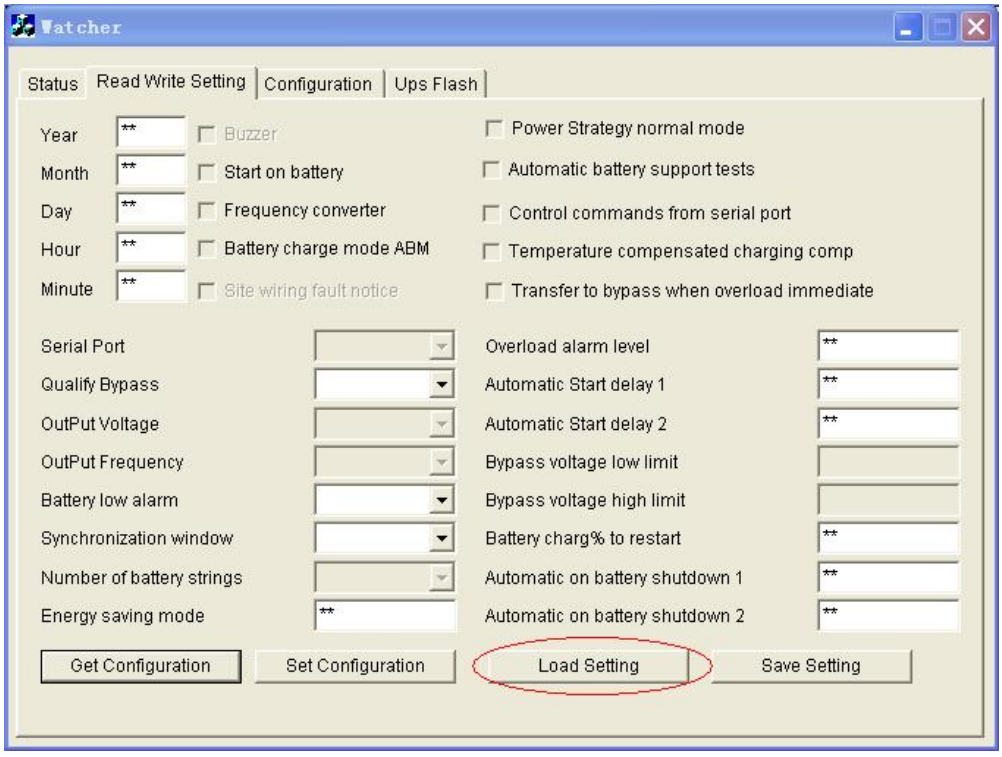


3. Load Configuration

Click “Load Setting” to load a configuration file (*.ini), and show it at interface.

If some data is invalid, then edit box will be “**”, select box will be “”, check box will be  .

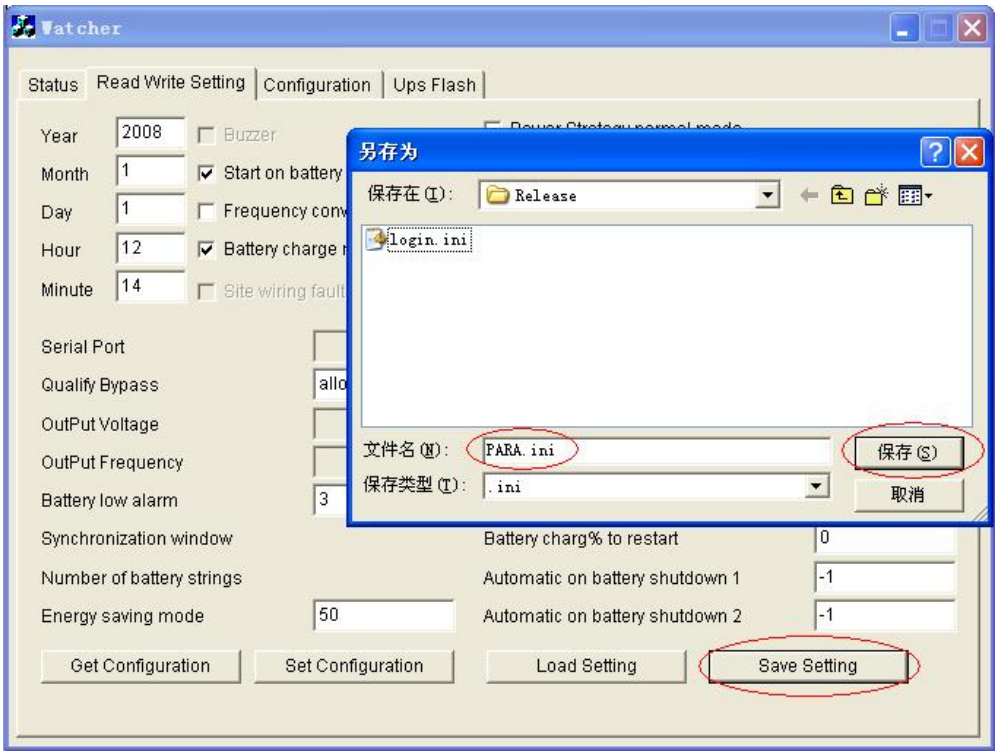




4. Save Configuration

Click “Save Setting” to save the configuration which show at interface to .ini file.

If some data is invalid, then save operation will not be executed.



Note:

Configuration Requirement

Parameter	Requirement
Year	0~9999
Month	1~12
Day	1~31
Hour	0~24
Minute	0~59
Start on battery	checked or unchecked
Frequency converter	checked or unchecked
Battery charge mode ABM	checked or unchecked
Power strategy normal mode	checked or unchecked
Automatic battery support tests	checked or unchecked
Control commands from serial port	checked or unchecked
Temperature compensated charging comp	checked or unchecked
Transfer to bypass when overload immediate	checked or unchecked
Qualify bypass	allow detect fault detect disable bypass no detect
Battery low alarm(BEEBatLowTime)	2,3,5,255
Synchronization window	0,50,100,200,300
Energy saving mode	50~100, or 65535
Overload alarm level	10~100

Automatic static delay1	0~32767
Automatic static delay2	0~32767
Battery charge% to restart	0~100
Automatic on battery shutdown1	0~32767
Automatic on battery shutdown2	0~32767

Return to Catalog

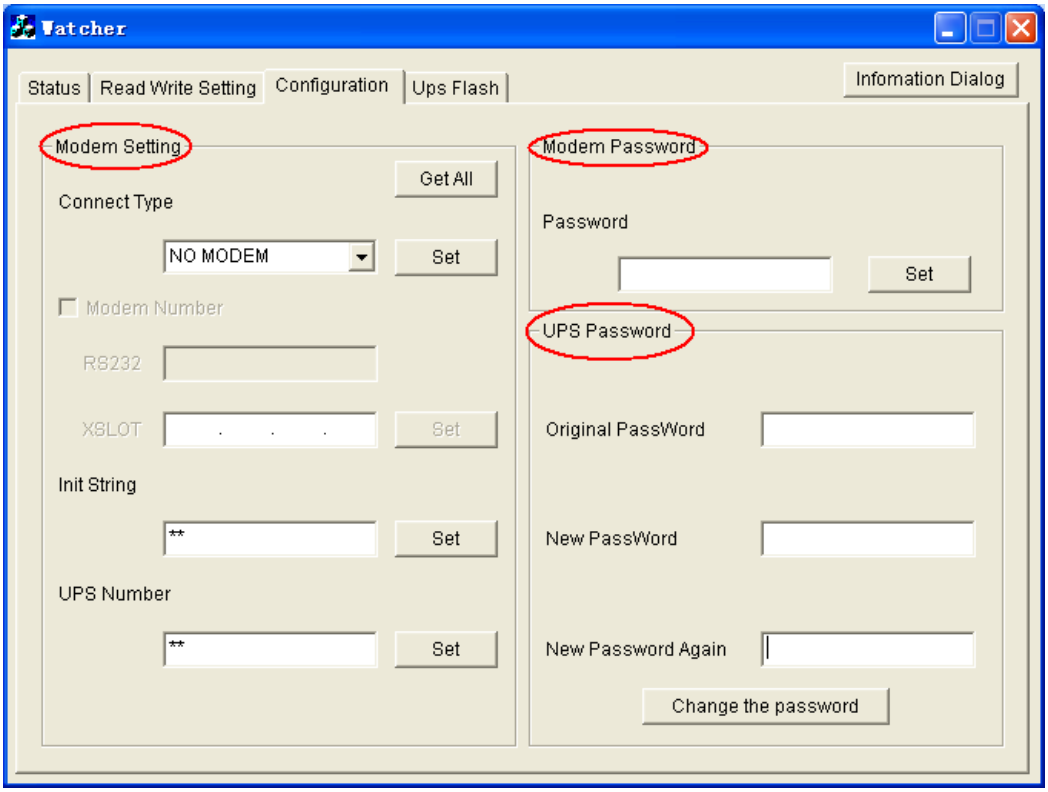
IV. Watcher configuration

This table has three Parts:

Modem Setting;

Modem Password;

UPS Password.

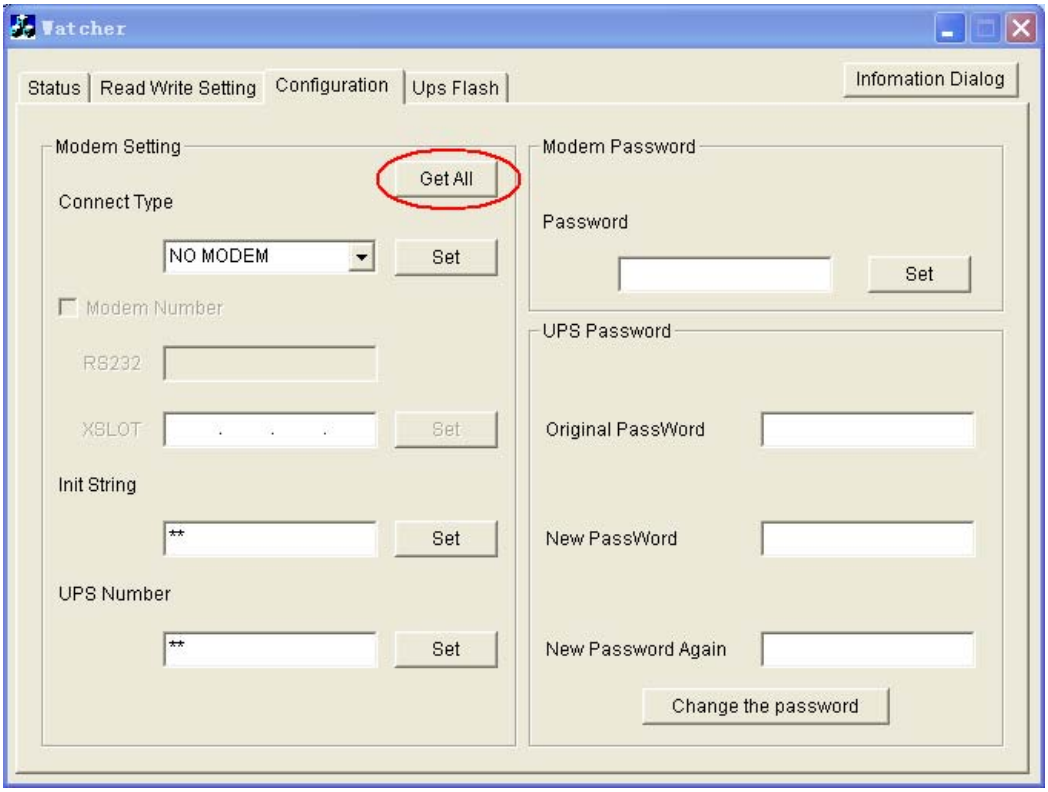


1. Modem Setting

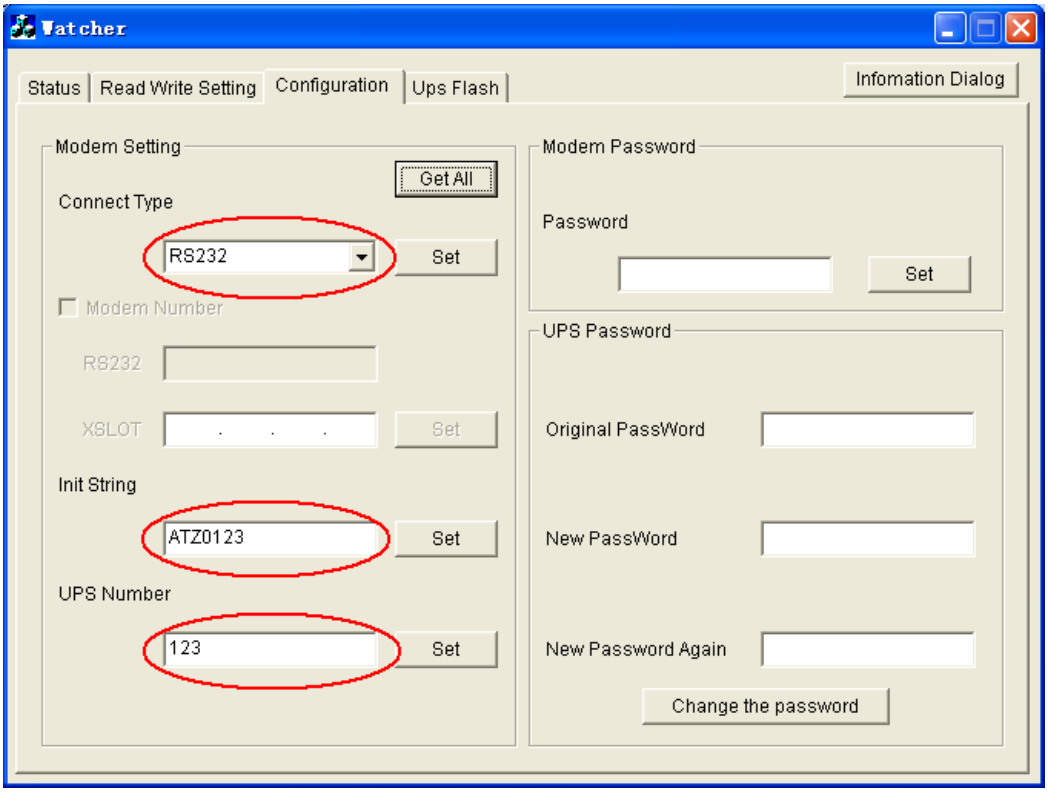
In this part, user can get and set Modem Settings, including: Connect Type, Modem Number (haven't completed), Init String, UPS Number.

a. Get settings

After open a port, press "Get All" button to get settings, including: Connect Type, Modem Number (haven't complete), Init String, UPS Number.

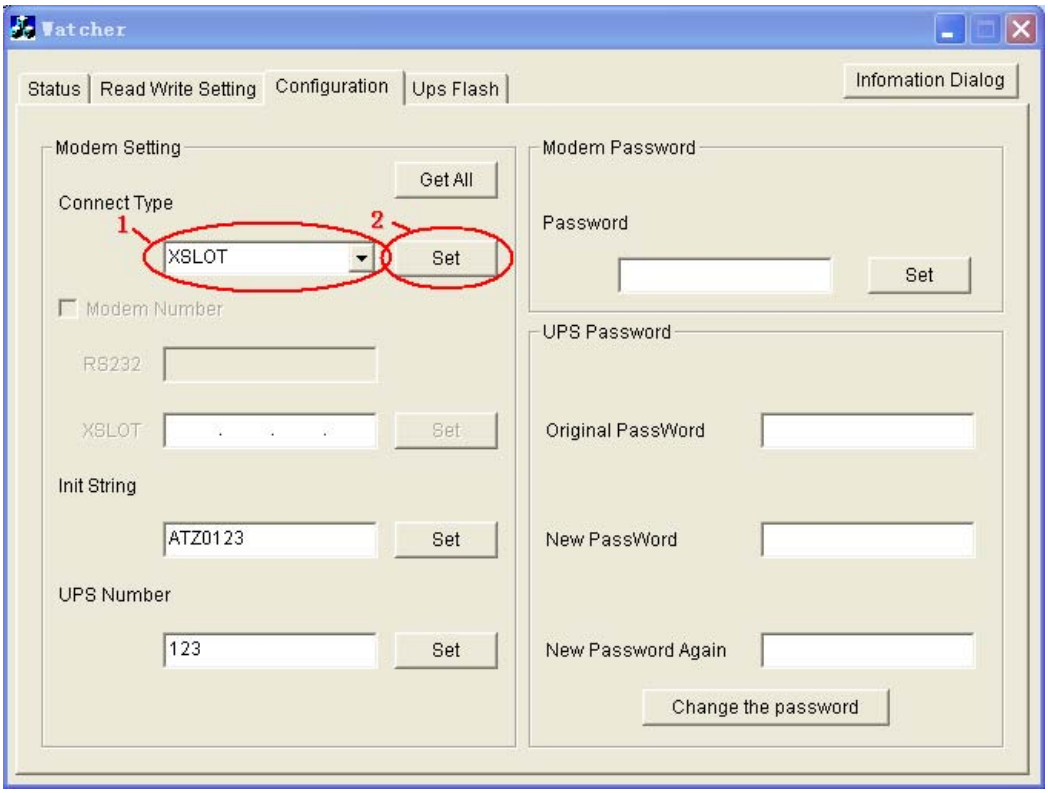

Watcher
Status
Read Write Setting
Configuration
Ups Flash
Infomation Dialog
Modem Setting
Get All
Connect Type
NO MODEM
Set
Modem Number
RS232
XSLOT
Set
Init String
**
Set
UPS Number
**
Set
Modem Password
Password
Set
UPS Password
Original PassWord
New PassWord
New Password Again
Change the password

Result:

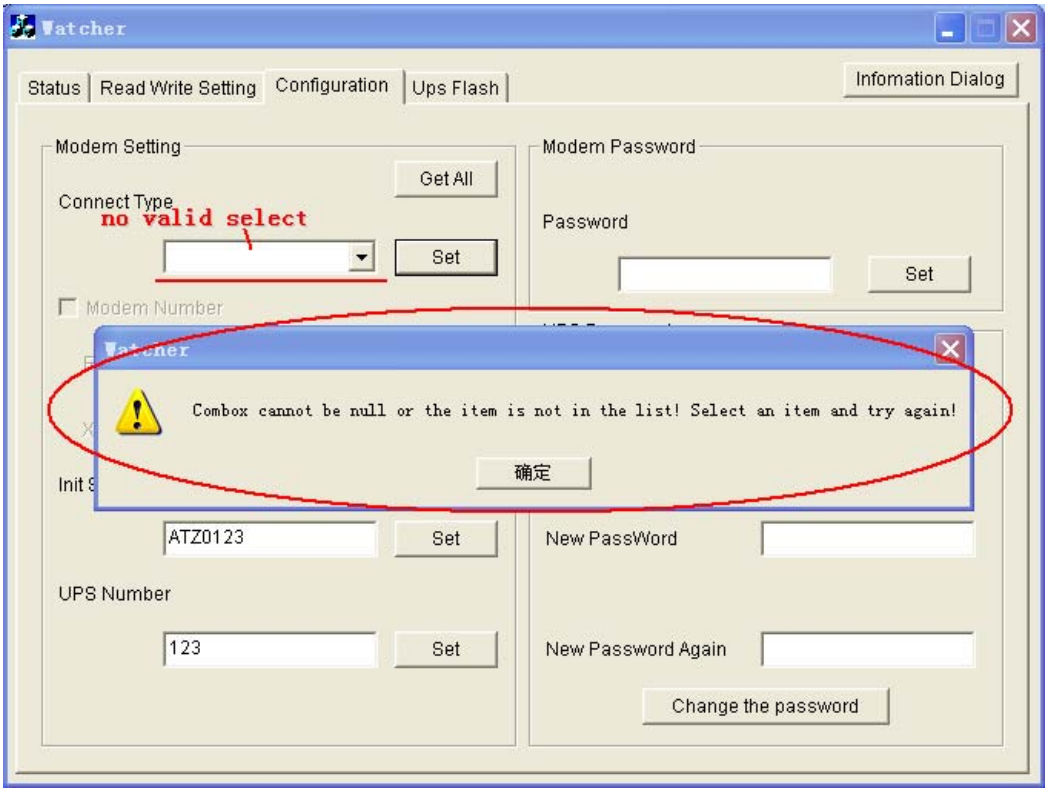

Watcher
Status
Read Write Setting
Configuration
Ups Flash
Infomation Dialog
Modem Setting
Get All
Connect Type
RS232
Set
Modem Number
RS232
XSLOT
Set
Init String
ATZ0123
Set
UPS Number
123
Set
Modem Password
Password
Set
UPS Password
Original PassWord
New PassWord
New Password Again
Change the password

b. Set Connect Type

Select a connect type in the combo box, and then press button “Set” in the right to set the UPS-Modem connect type.



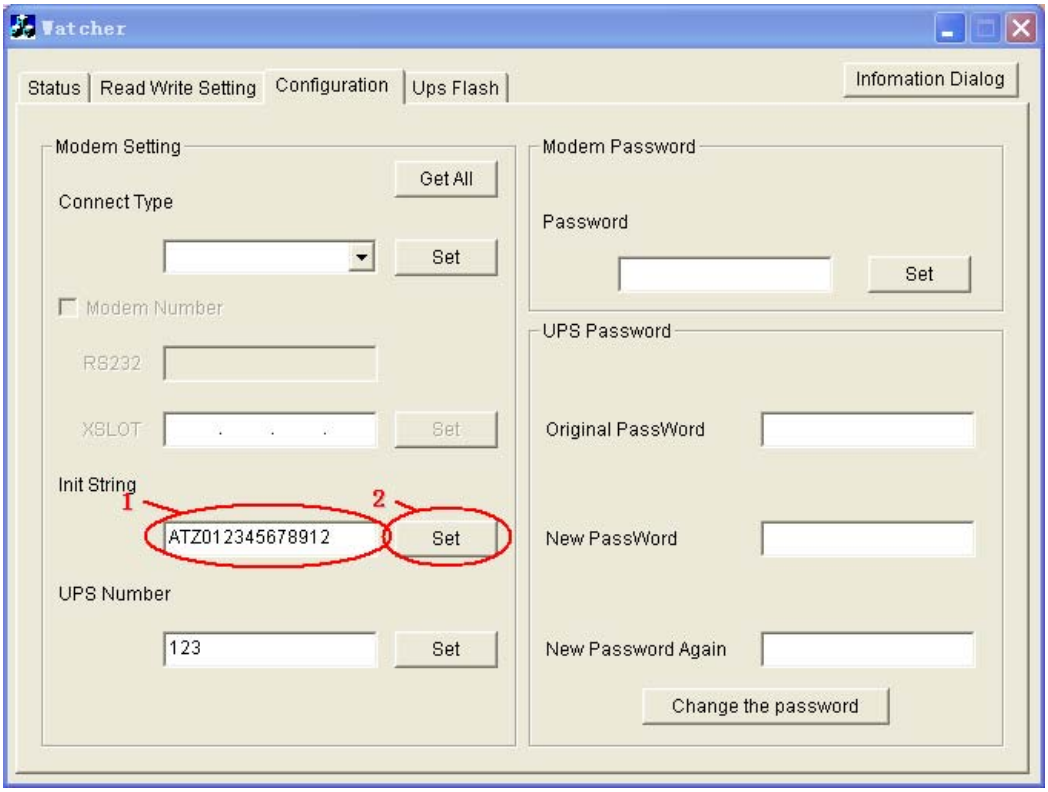
If no valid connect type be selected before click the button “Set” in the right, an error dialog will pop out.



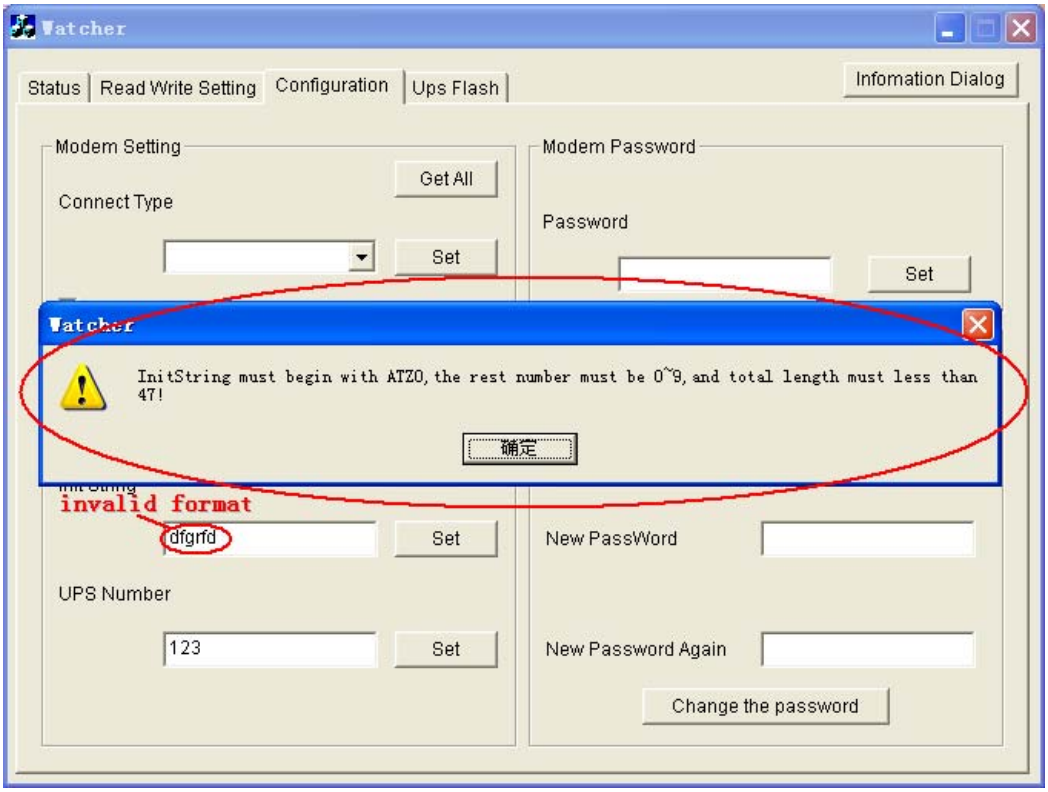
c. Modem Number (haven't complete)

d. Init String

Input a valid string in the Edit box, then press "Set" button in the right to set init string.

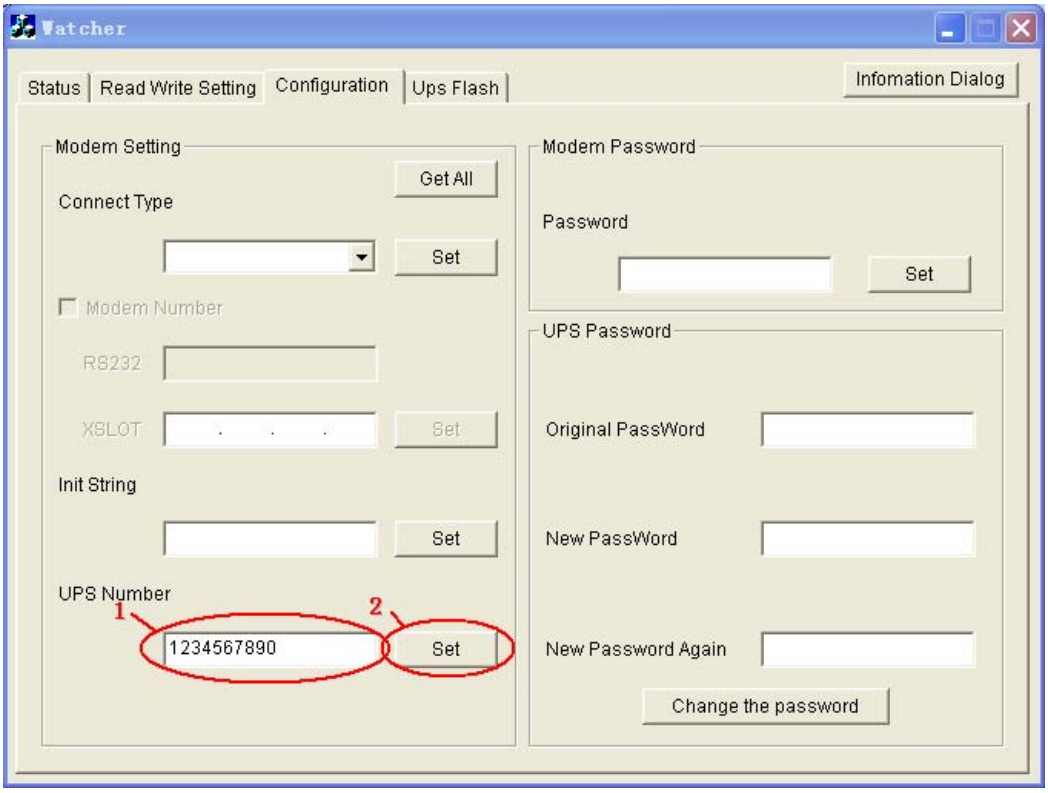


The valid string must begin with “ATZ0”, follow with 0 ~ 9, and total lengths must less than 47, other wise an error dialog will pop out.

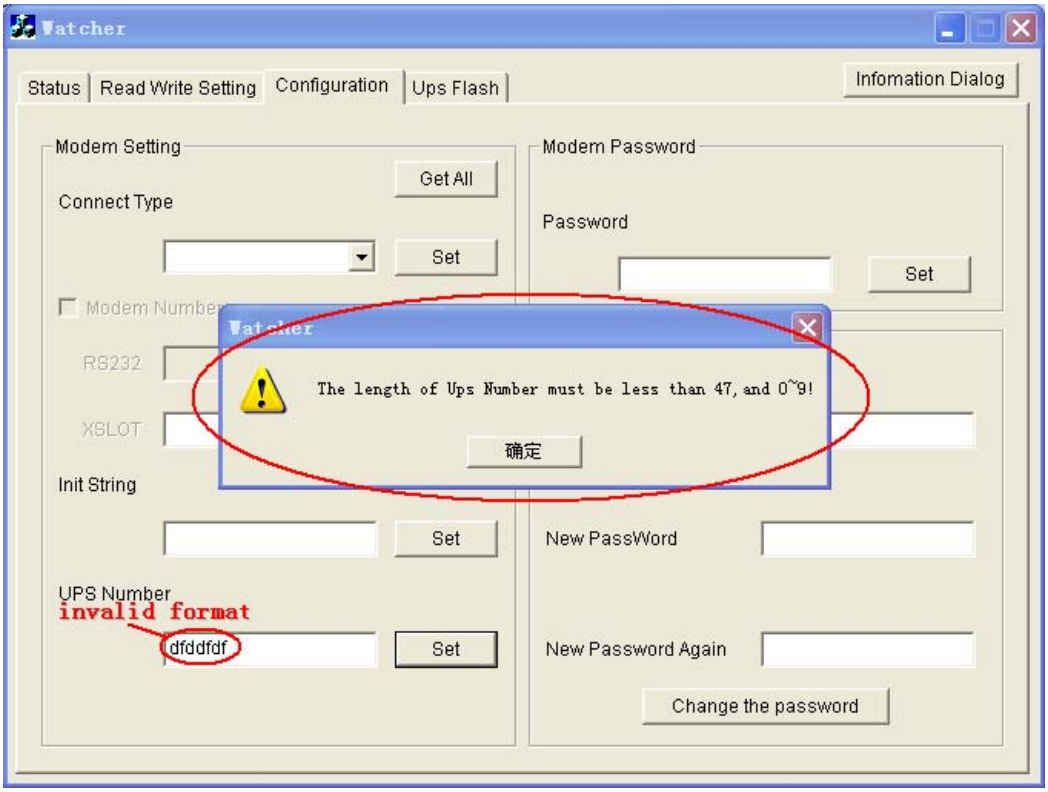


e. UPS Number

Input a valid number in the Edit box, then press “Set” button in the right to set UPS Number.



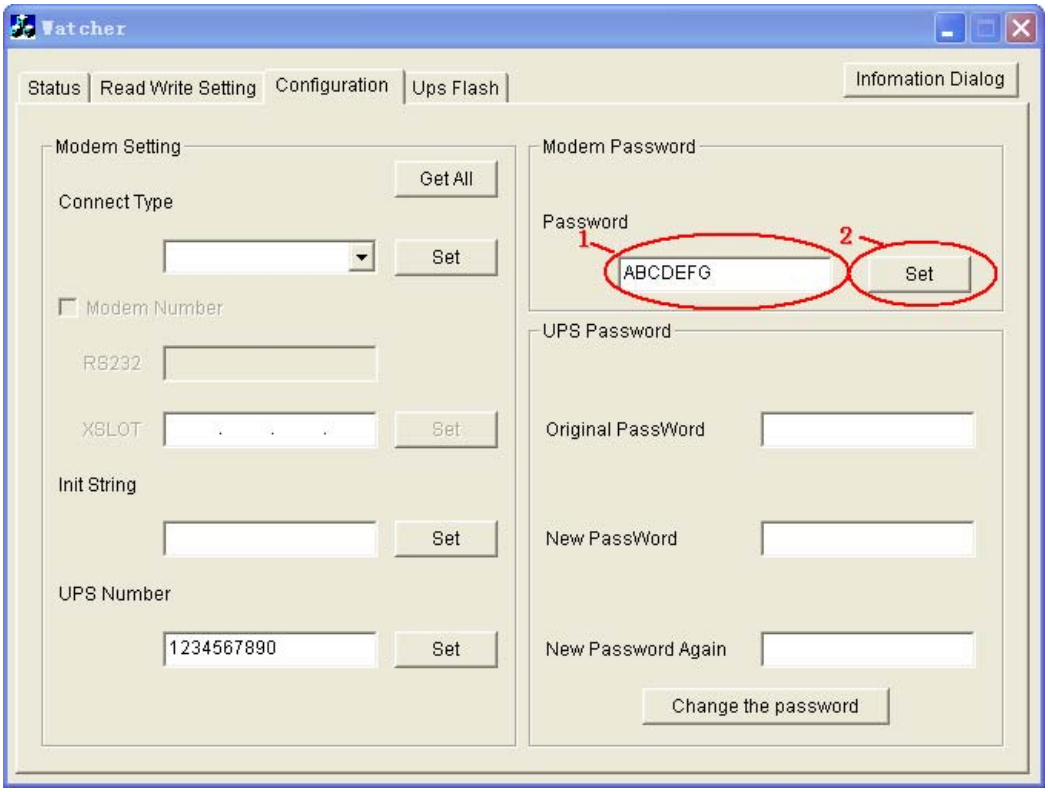
The valid number must be 0 ~ 9, and total lengths must less than 31, other wise an error dialog will pop out.



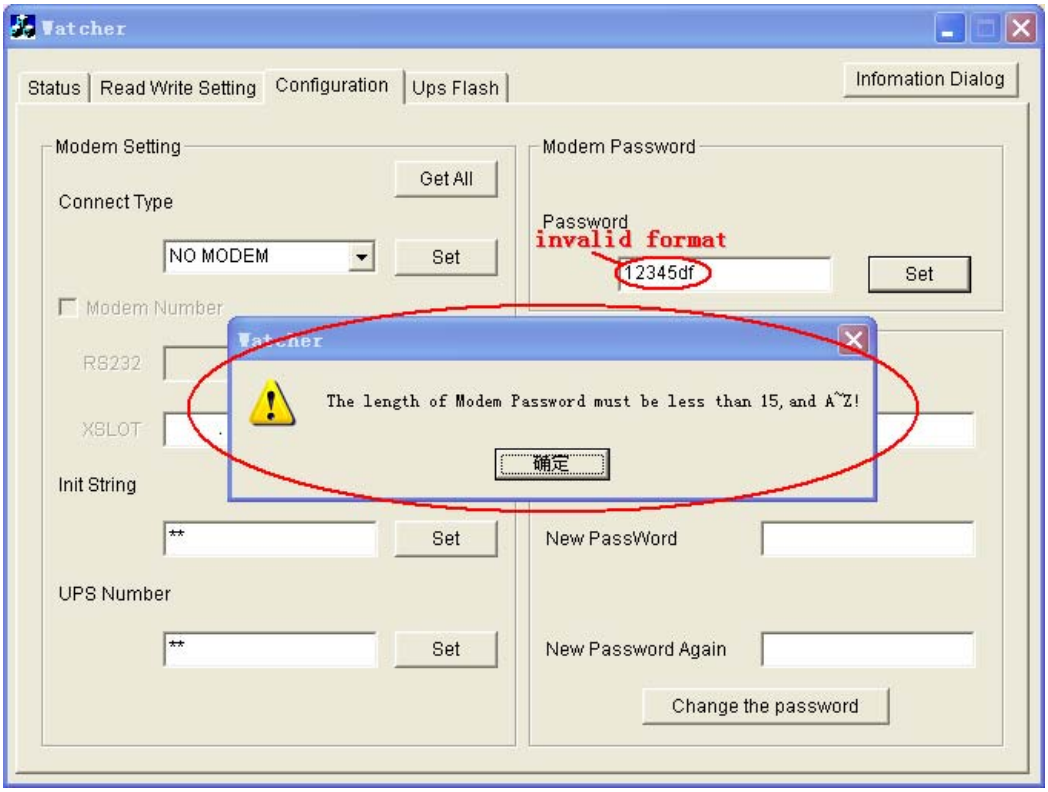
2. Modem Password

In this part, user can set modem password.

Input a valid password in the Edit box, then press button “Set” to set the modem’ s password.



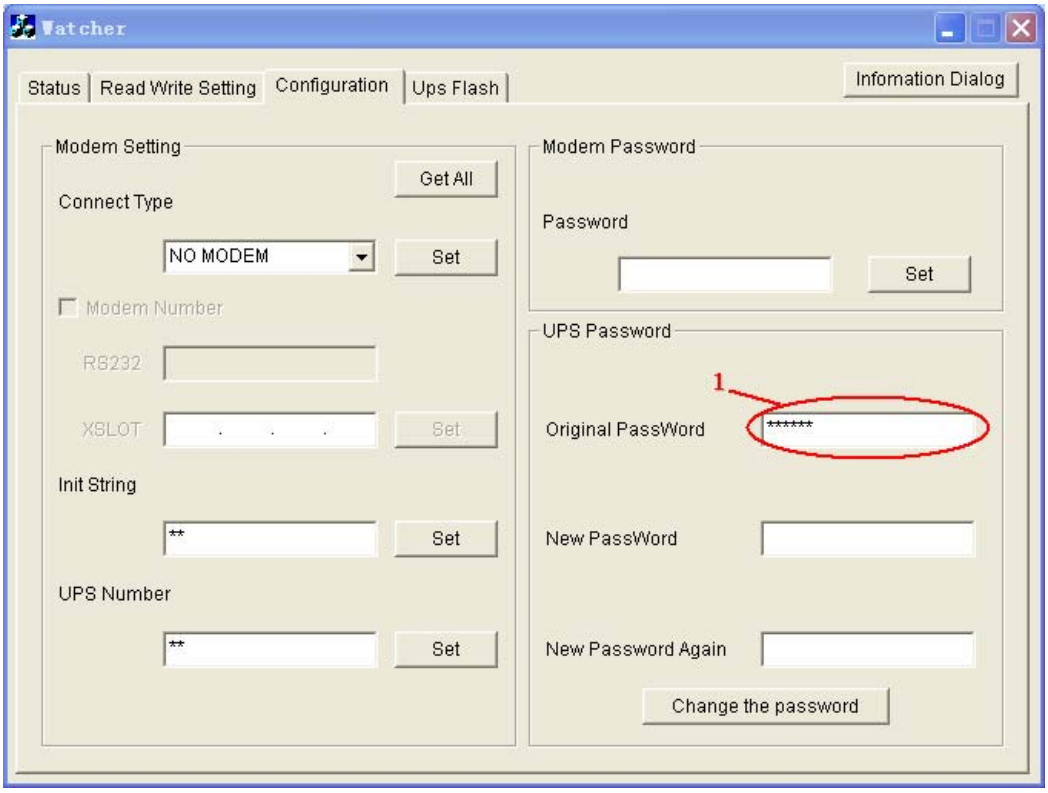
The valid number must be A ~ Z, and total lengths must less than 15, other wise an error dialog will pop out.



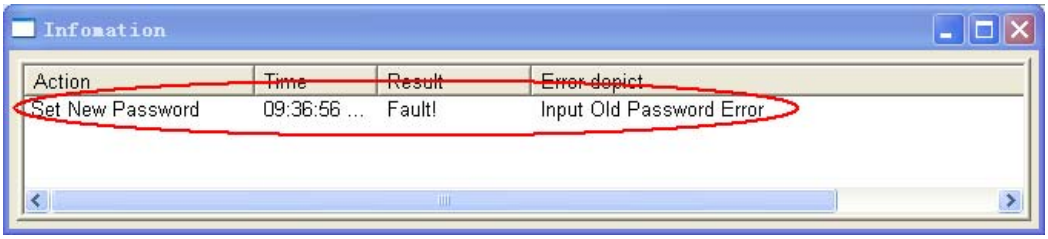
3. UPS Password

In this part, user can change the UPS's password.

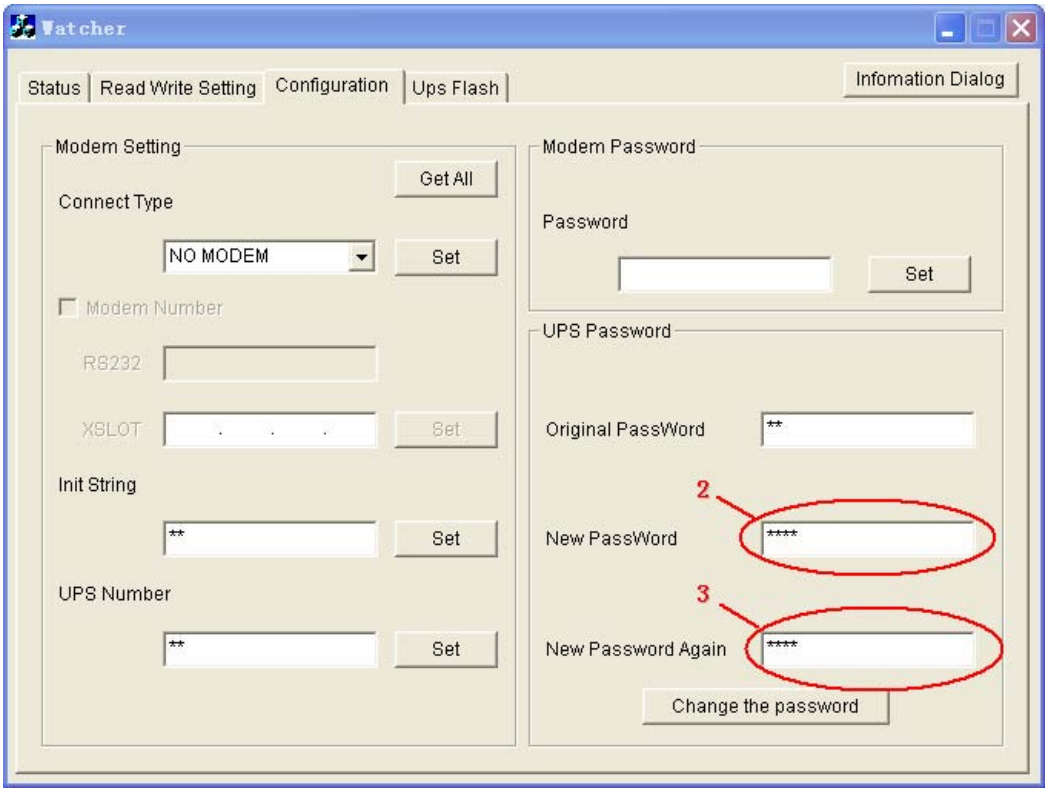
First input a valid password in Original Password Edit box.



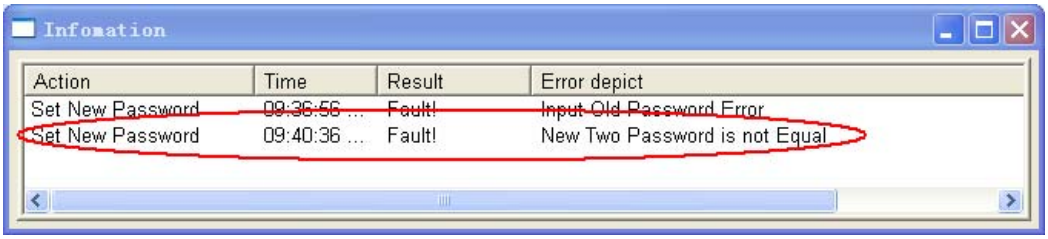
If the input password is error, error information will give out in the information dialog.



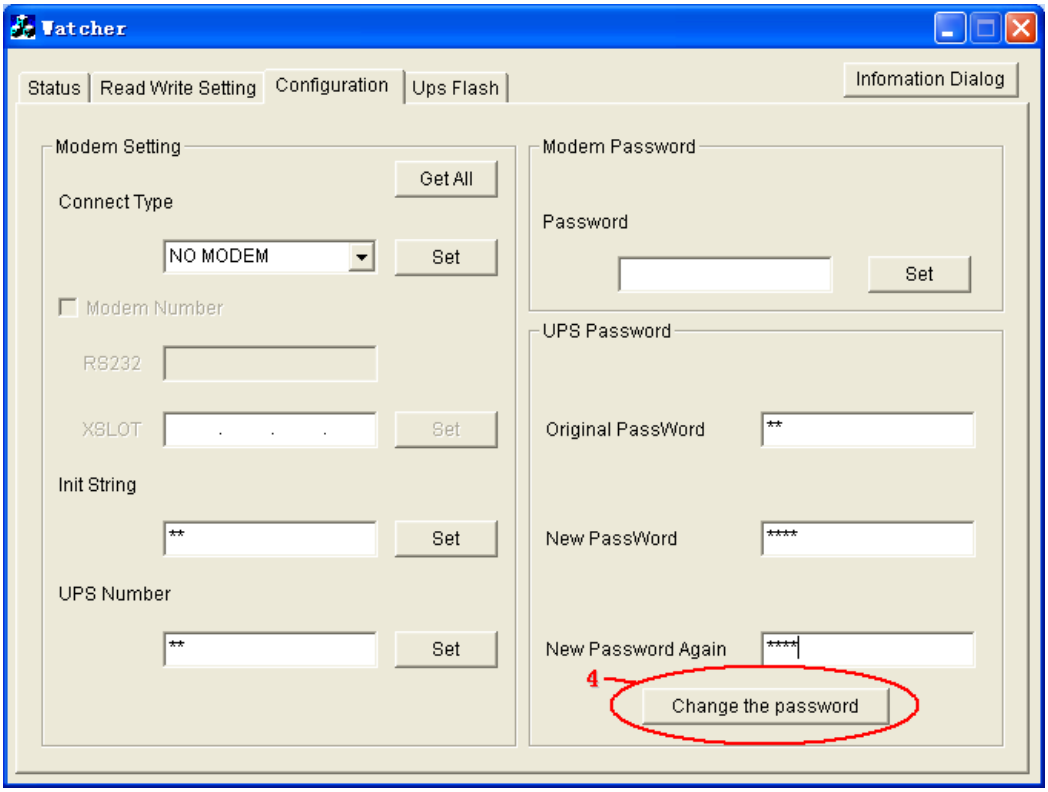
Second, input new password twice in the edit boxes.



Two new password input must be equal; other wise error information will give out in the information dialog.



Third, Press “Change the password” button to change the UPS’s password.

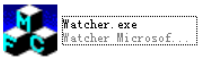


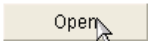
Return to Catalog

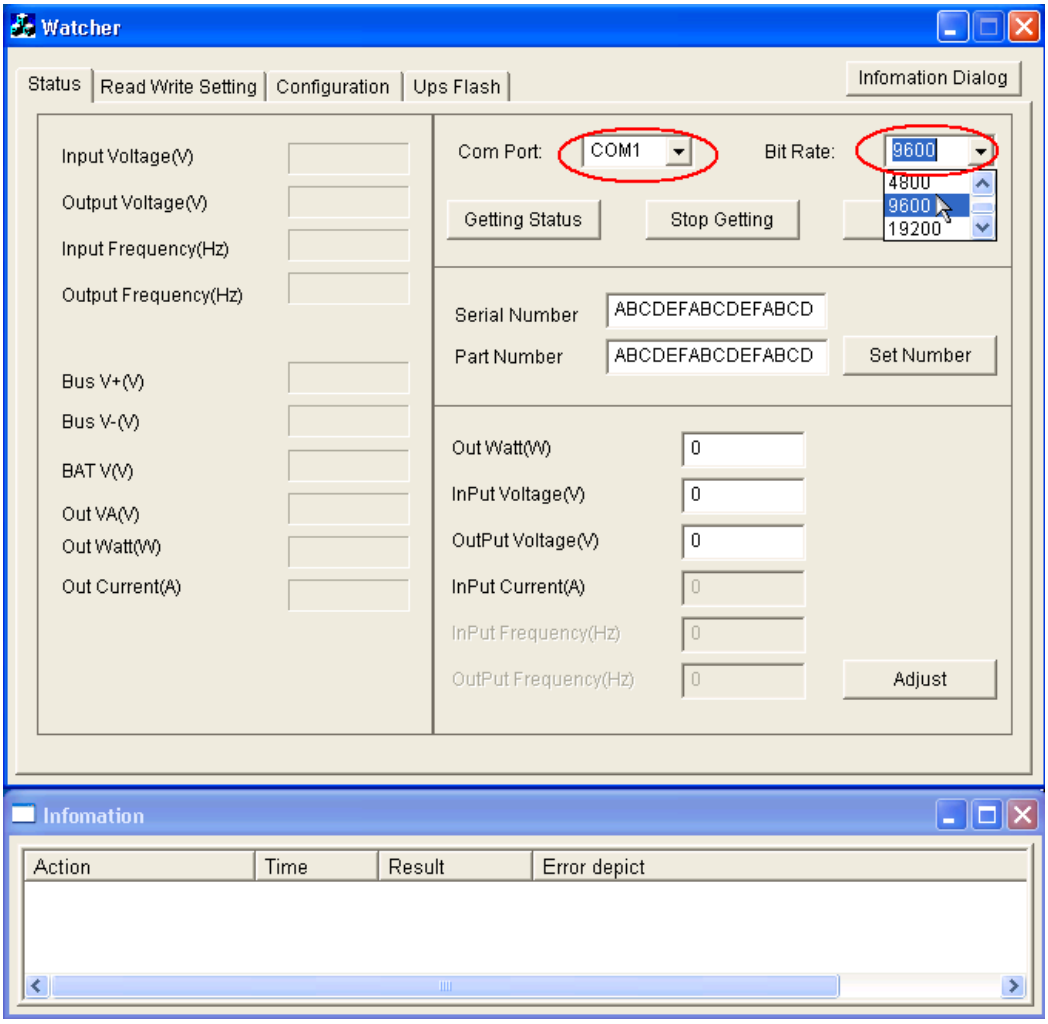
V. DSP Firmware Updating (RS232) – Flash Normal

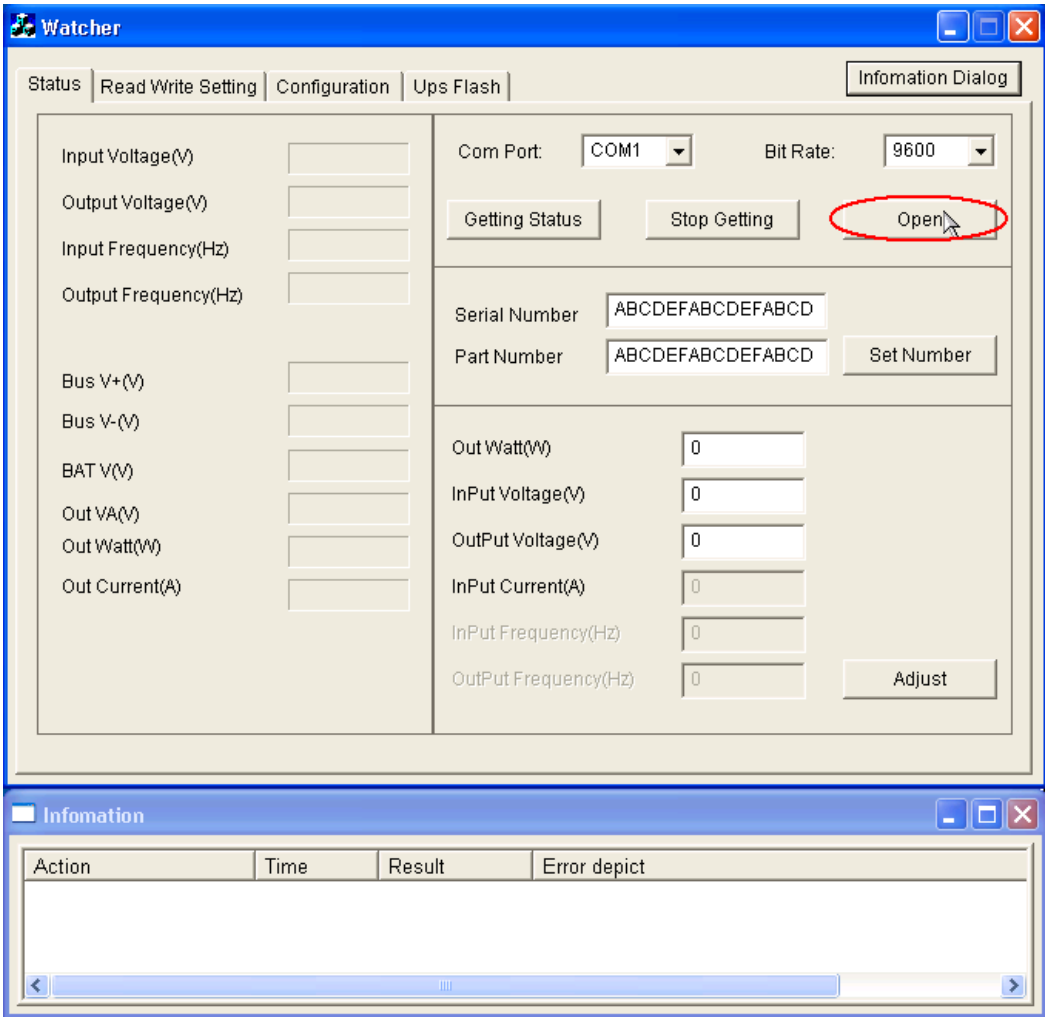
Flash Normal is used to flash DSP firmware when the UPS works at normal state. (UPS's AC input is ok, DSP firmware works well, and UPS on standby mode).

1. Connect PC and UPS use RS232 cable, make the UPS is on standby mode.

2. Double Click  to open Watcher.

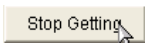
3. Choose the right COM port and Baud rate, then press  to open COM port.


Watcher
Status
Read Write Setting
Configuration
Ups Flash
Infomation Dialog
Input Voltage(V)
Output Voltage(V)
Input Frequency(Hz)
Output Frequency(Hz)
Bus V+(V)
Bus V-(V)
BAT V(V)
Out VA(V)
Out Watt(W)
Out Current(A)
Com Port:
COM1
Bit Rate:
9600
4800
9600
19200
Getting Status
Stop Getting
Serial Number
ABCDEFABCDEFABCD
Part Number
ABCDEFABCDEFABCD
Set Number
Out Watt(W)
0
InPut Voltage(V)
0
OutPut Voltage(V)
0
InPut Current(A)
0
InPut Frequency(Hz)
0
OutPut Frequency(Hz)
0
Adjust
Infomation
Action
Time
Result
Error depict

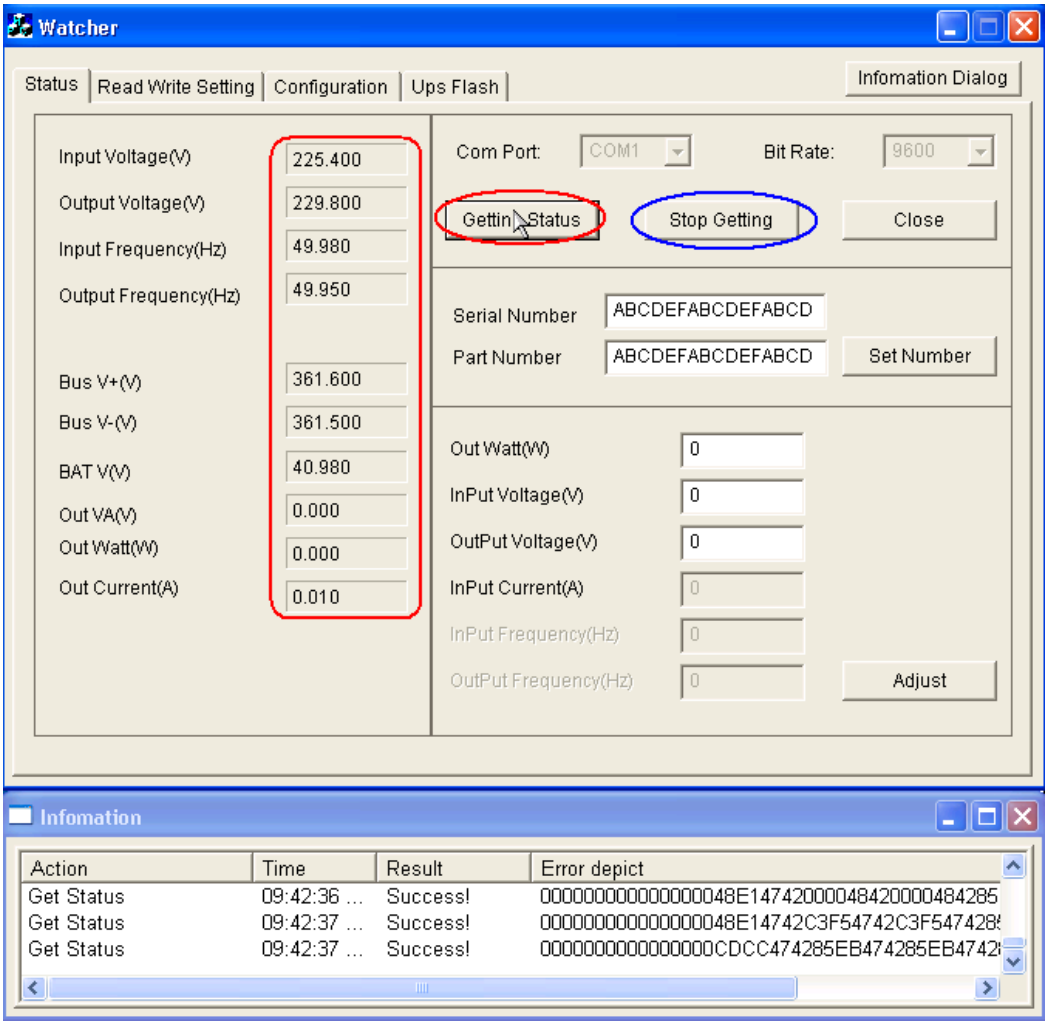


4. After press  , UPS's state will be shown in the left area.

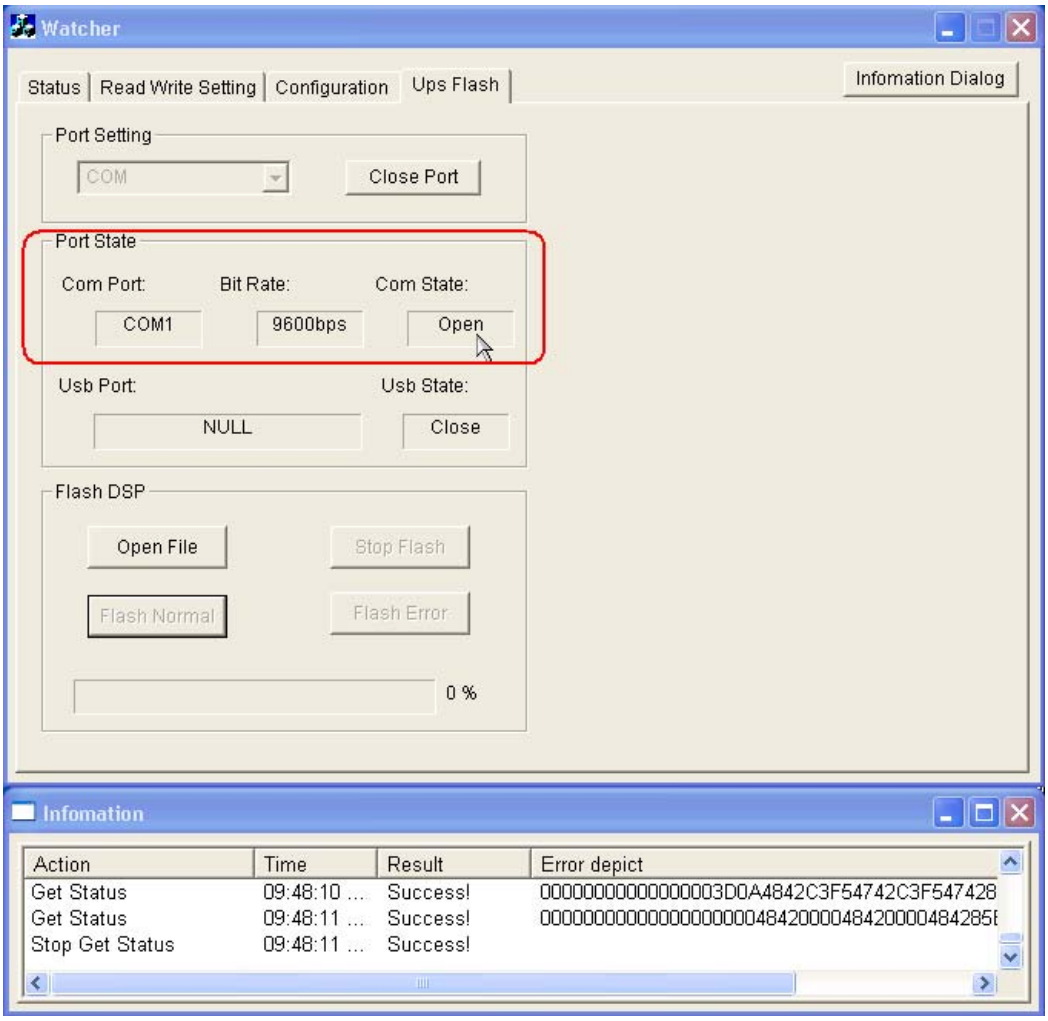
If these values are normal, it means the communication is OK.

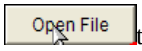
Then press  to stop getting status.

Note: Before you do the Flash Normal operation, please insure the communication is OK.

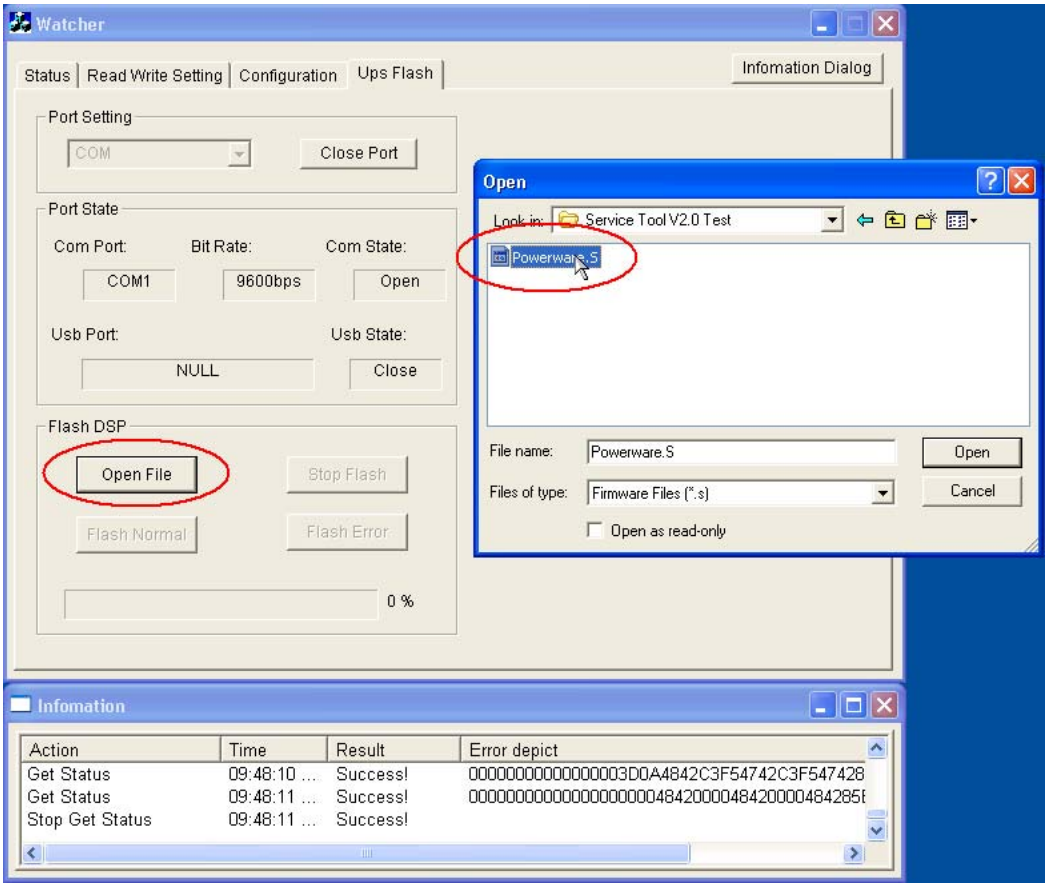


5. Press  tab to enter the Ups Flash Page, check the COM port state is OK.



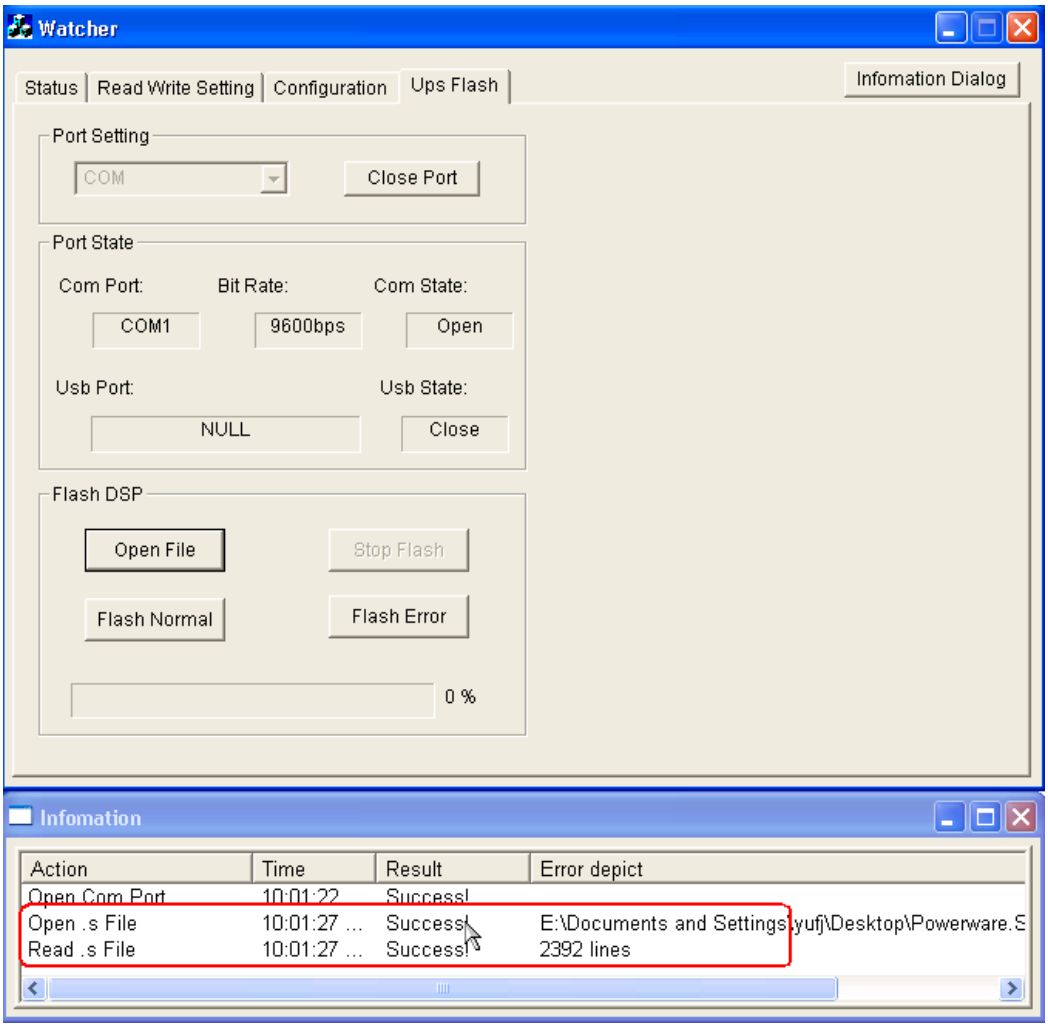
6. Click 

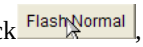
then choose the new DSP firmware：



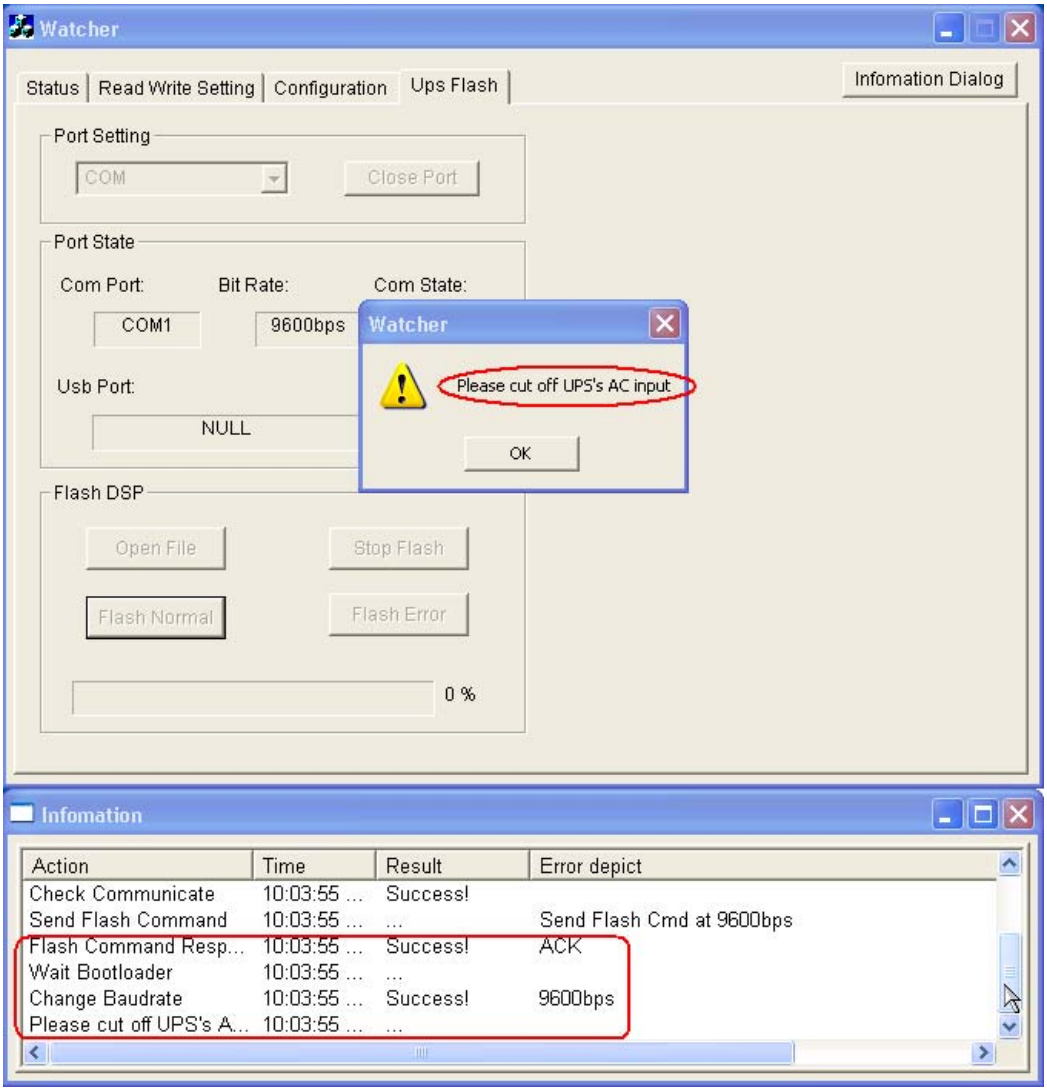
7. Double click the right Firmware, then it will show:

Note: Before update the Firmware, please recheck the Firmware File is the right one.



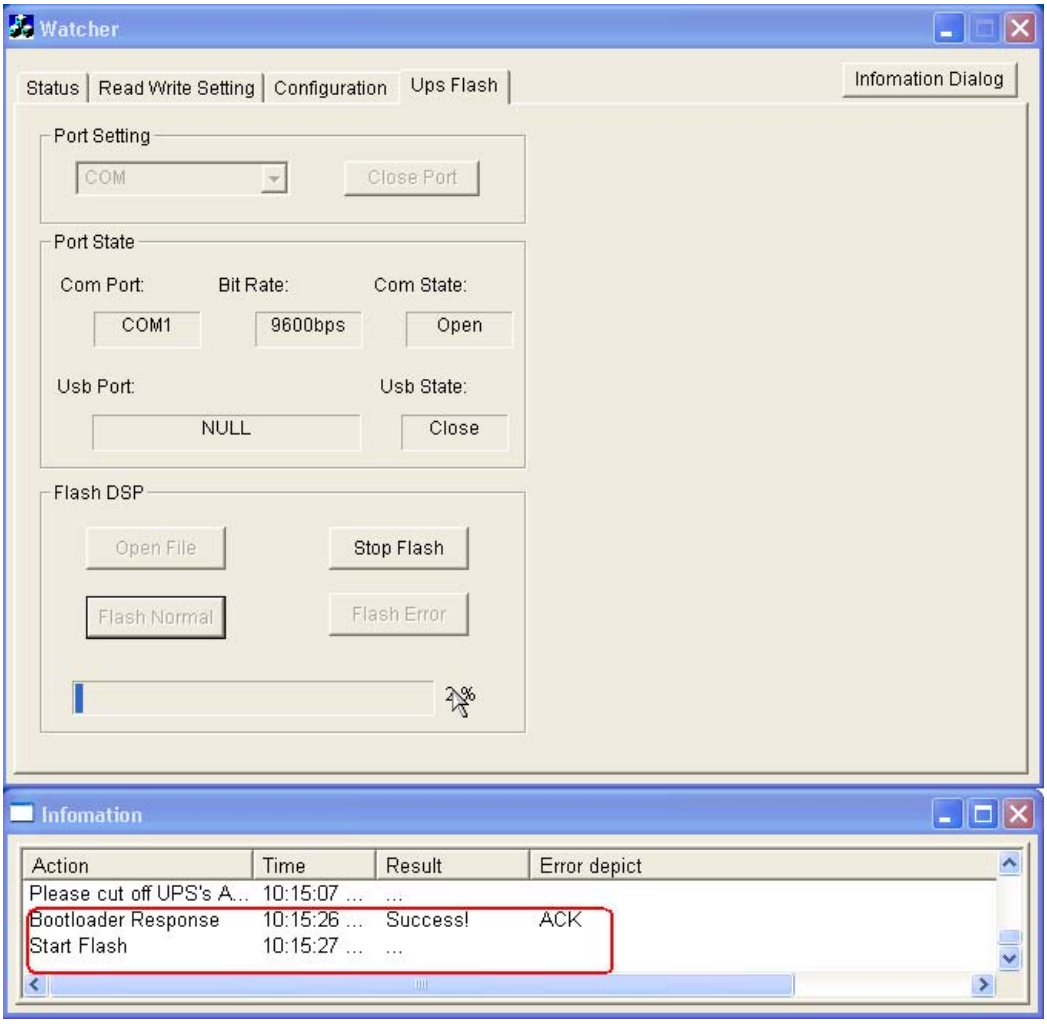
8. Click 

, then a Popup Message Box will show:

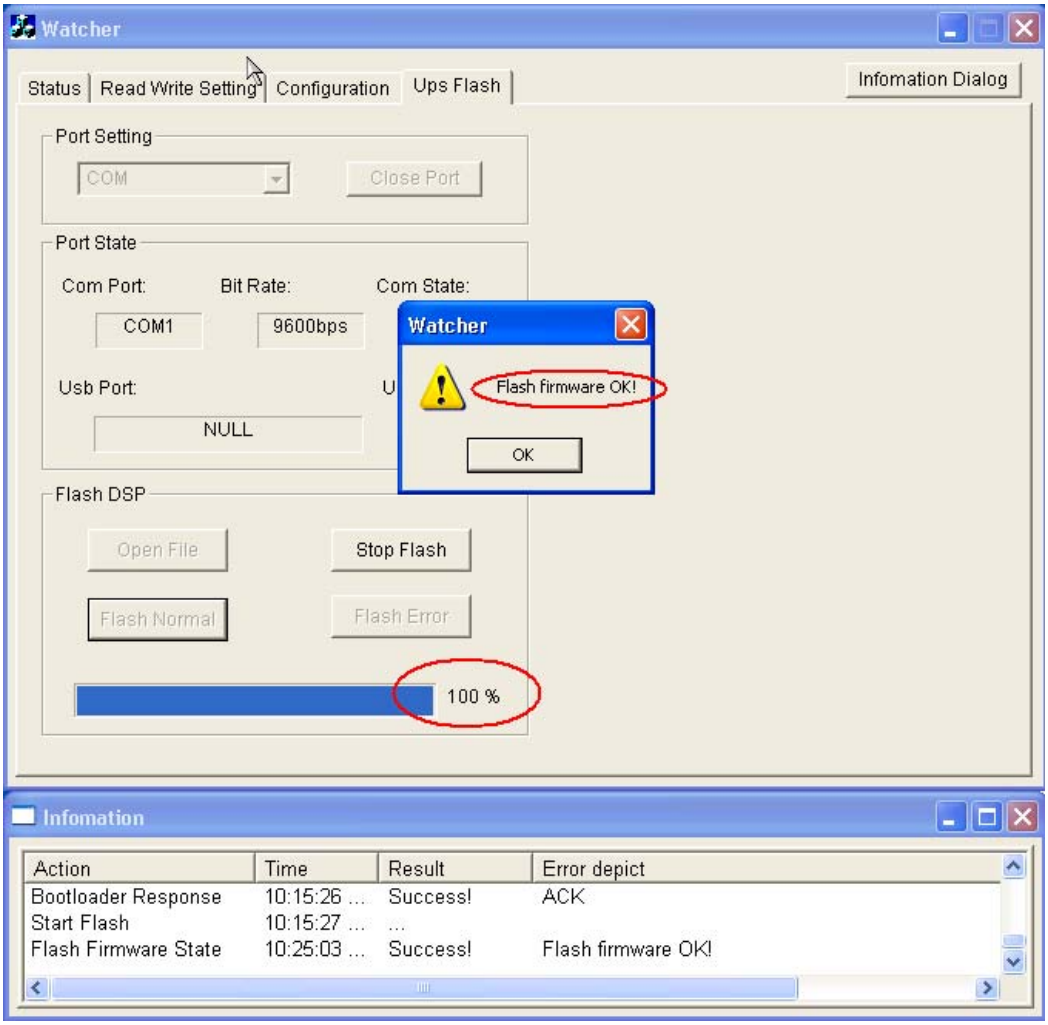


9. Then cut off UPS's AC input, press the OK button of the Popup Message Box in the step above.

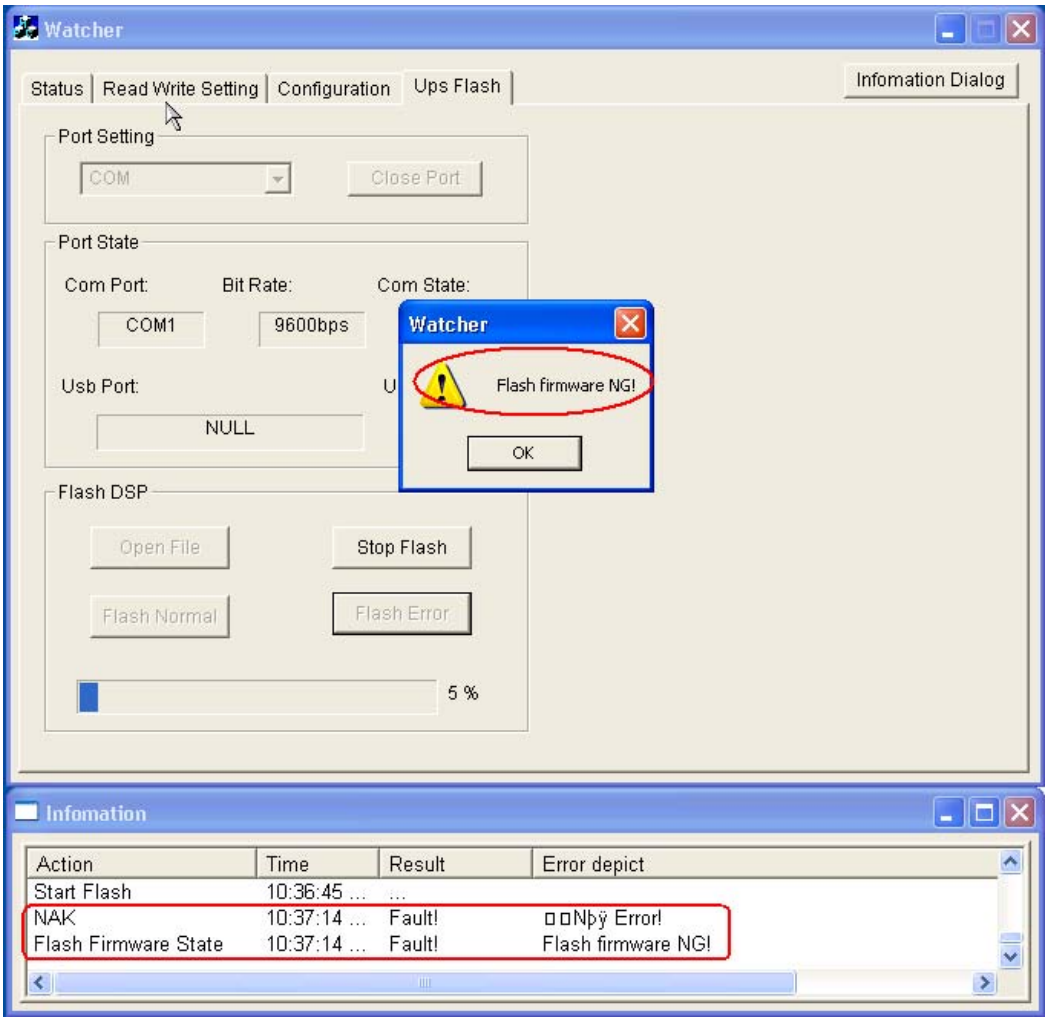
After a few seconds, the flash begins.



10. After updating is OK，it will show next picture：



Note: If the updating is NG ,it will popup “Flash firmware NG!” Message Box, and you should do **Part VI. DSP Firmware Updating (RS232) – Flash Error**.

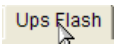


11. Then click OK to end the firmware updating.

Return to Catalog

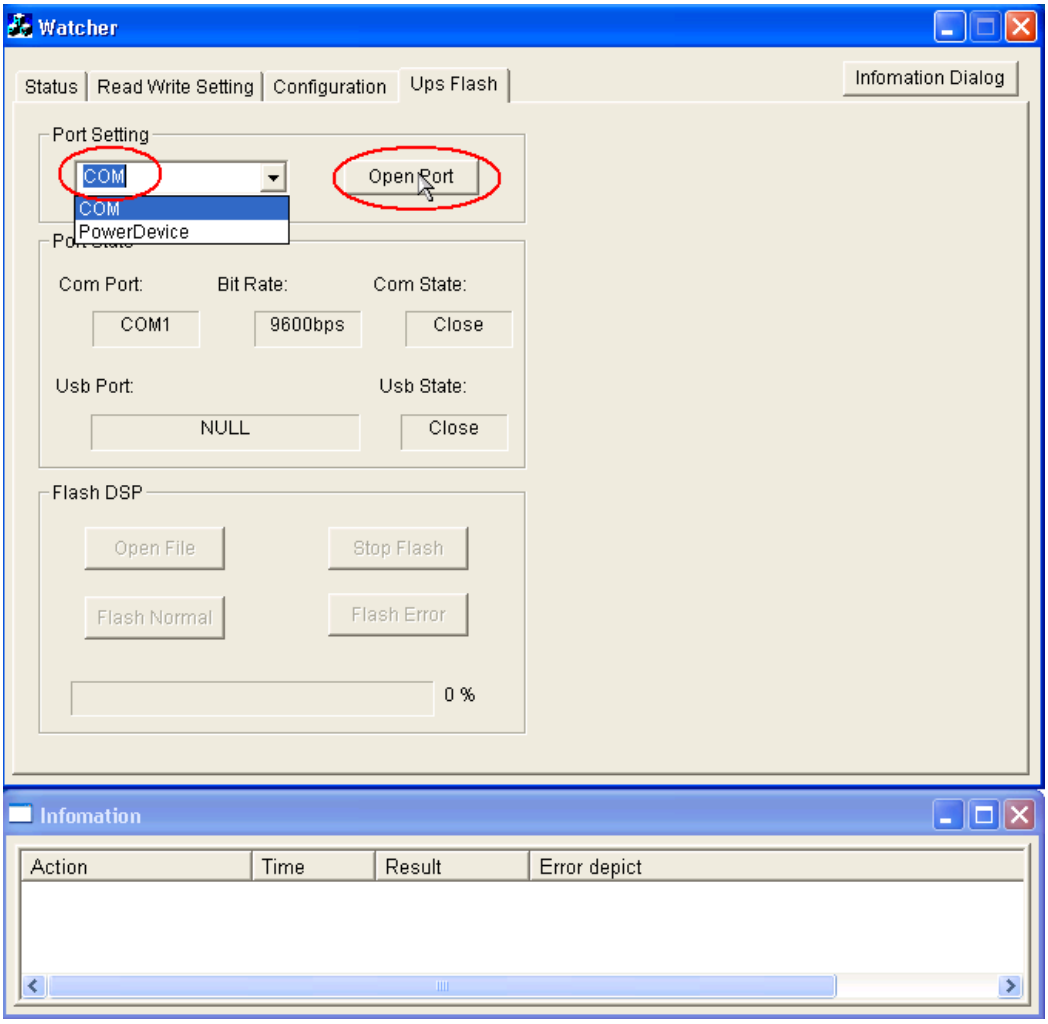
VI. DSP Firmware Updating (RS232) – Flash Error

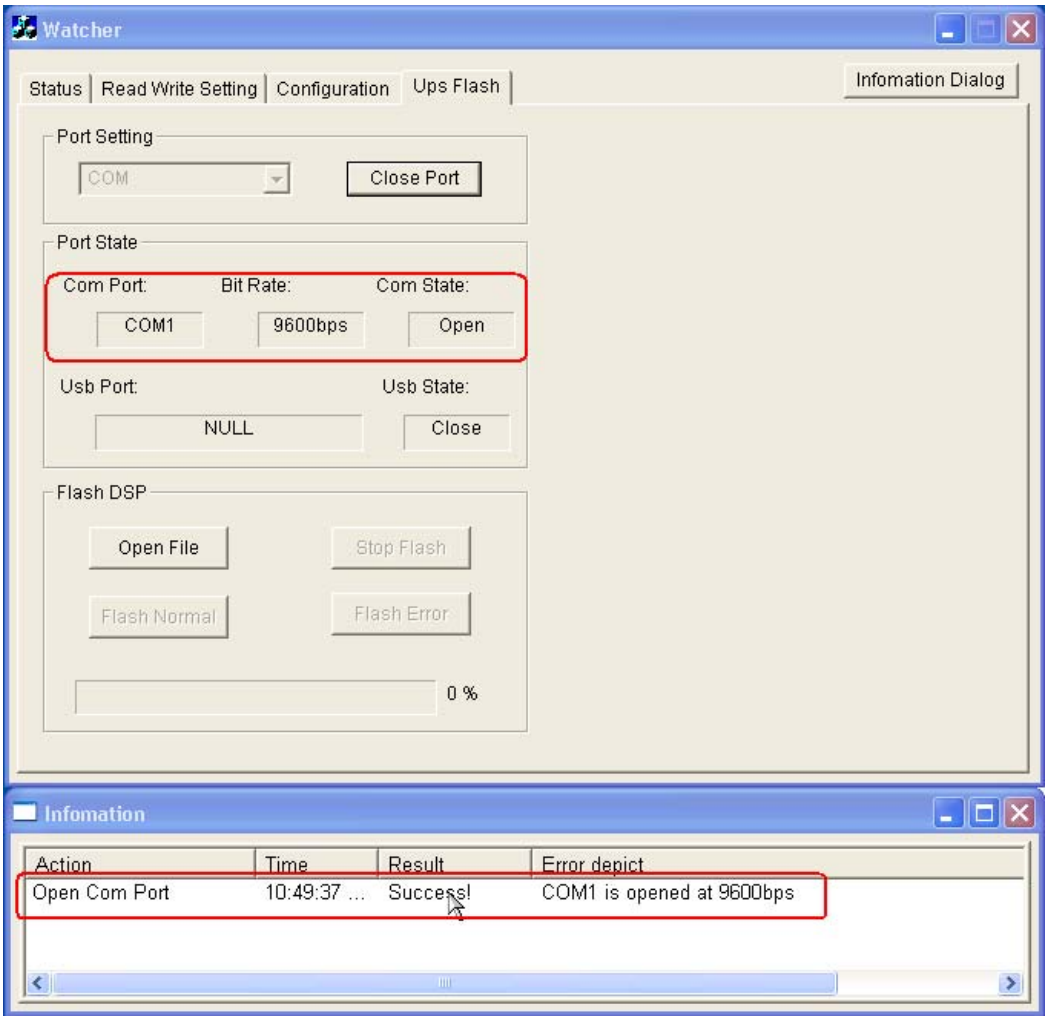
Note: This function is used after "V. DSP Firmware Updating (RS232) – Flash Normal" failed.
If DSP Firmware is NG, the UPS will beep all the time.

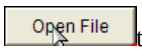
1. If watcher is closed, open it and press 

tab to enter the Ups Flash Page.

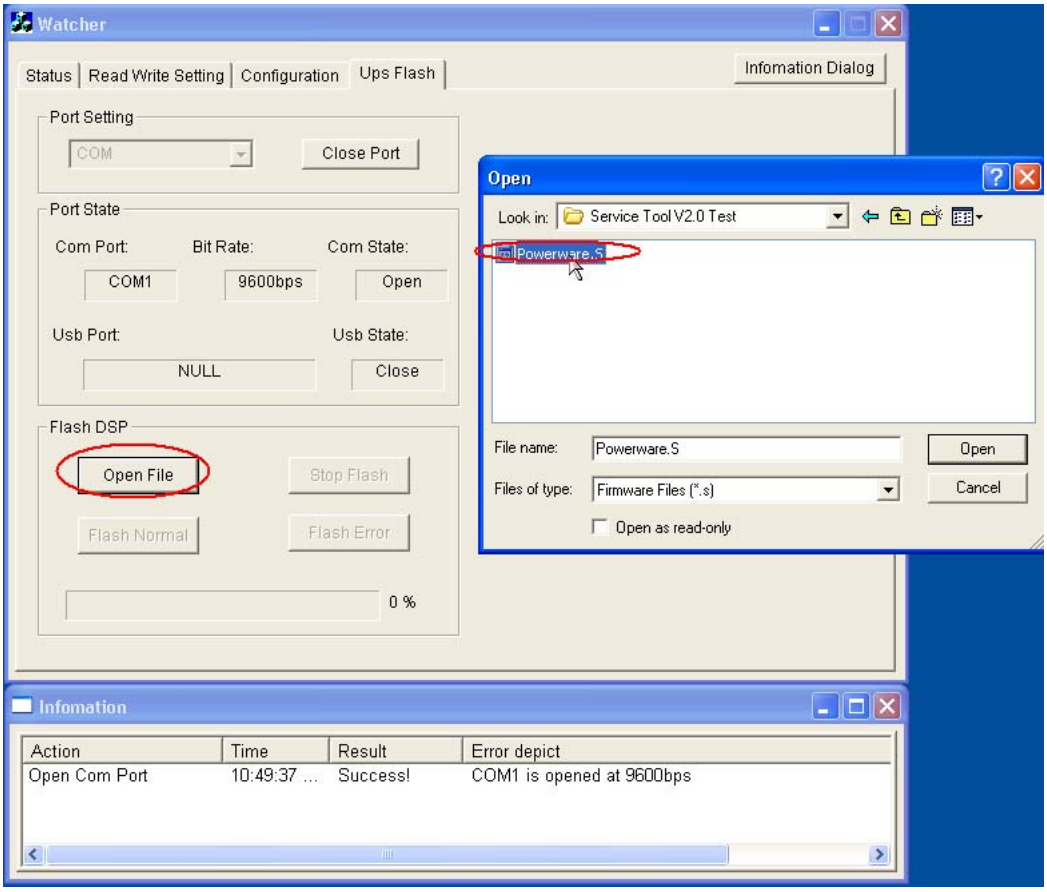
2. Choose COM Port and press 


Watcher
Status
Read Write Setting
Configuration
Ups Flash
Infomation Dialog
Port Setting
COM
COM
PowerDevice
Open Port
Com Port:
Bit Rate:
Com State:
COM1
9600bps
Close
Usb Port:
Usb State:
NULL
Close
Flash DSP
Open File
Stop Flash
Flash Normal
Flash Error
0 %
Infomation
Action
Time
Result
Error depict



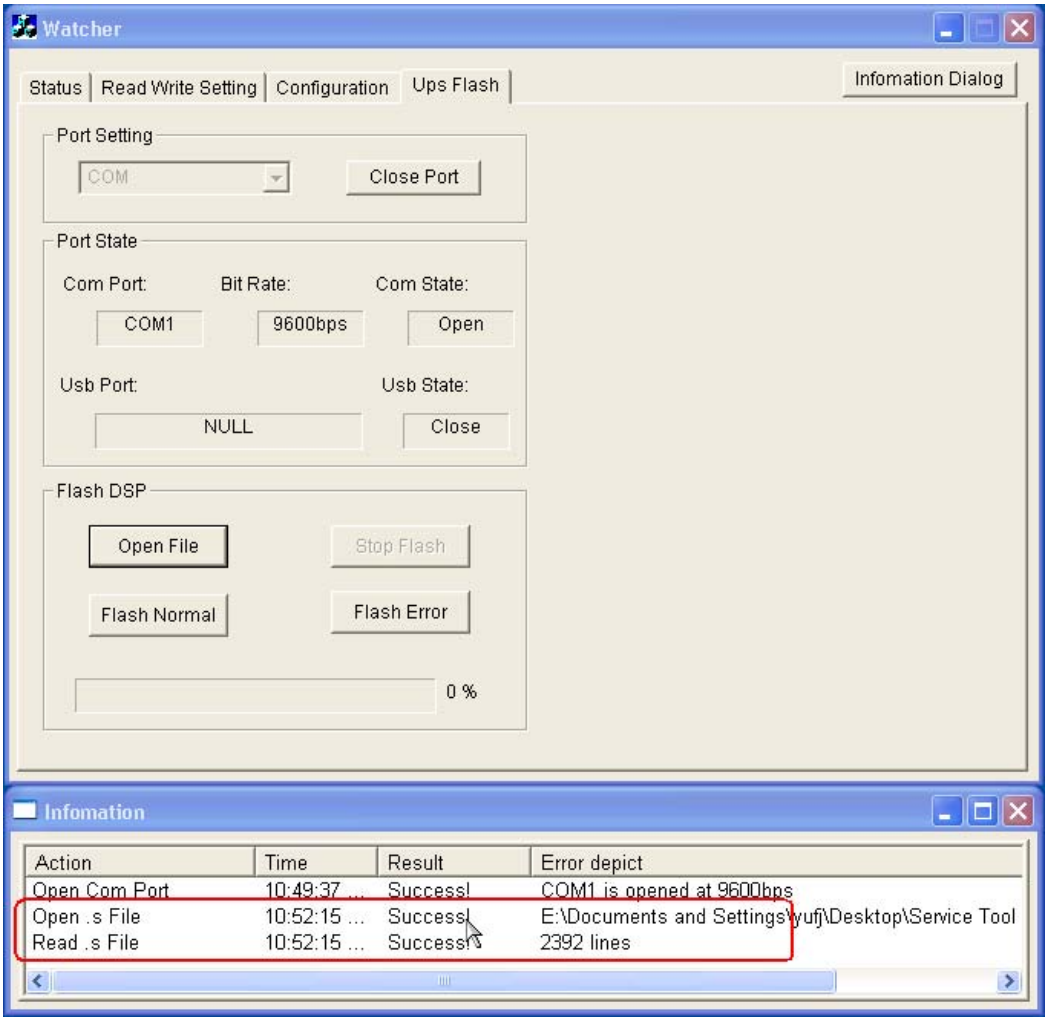
3. Click 

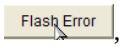
then choose the new DSP firmware：

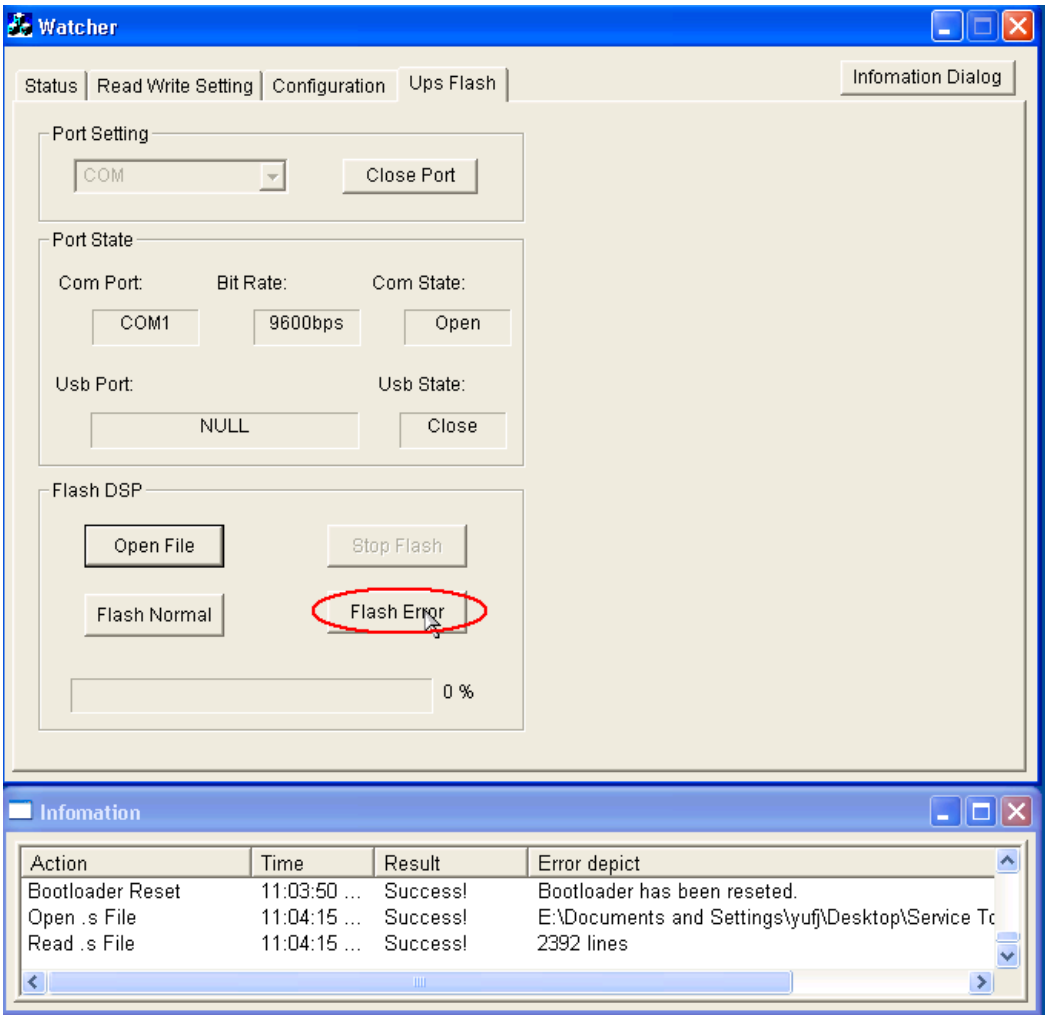


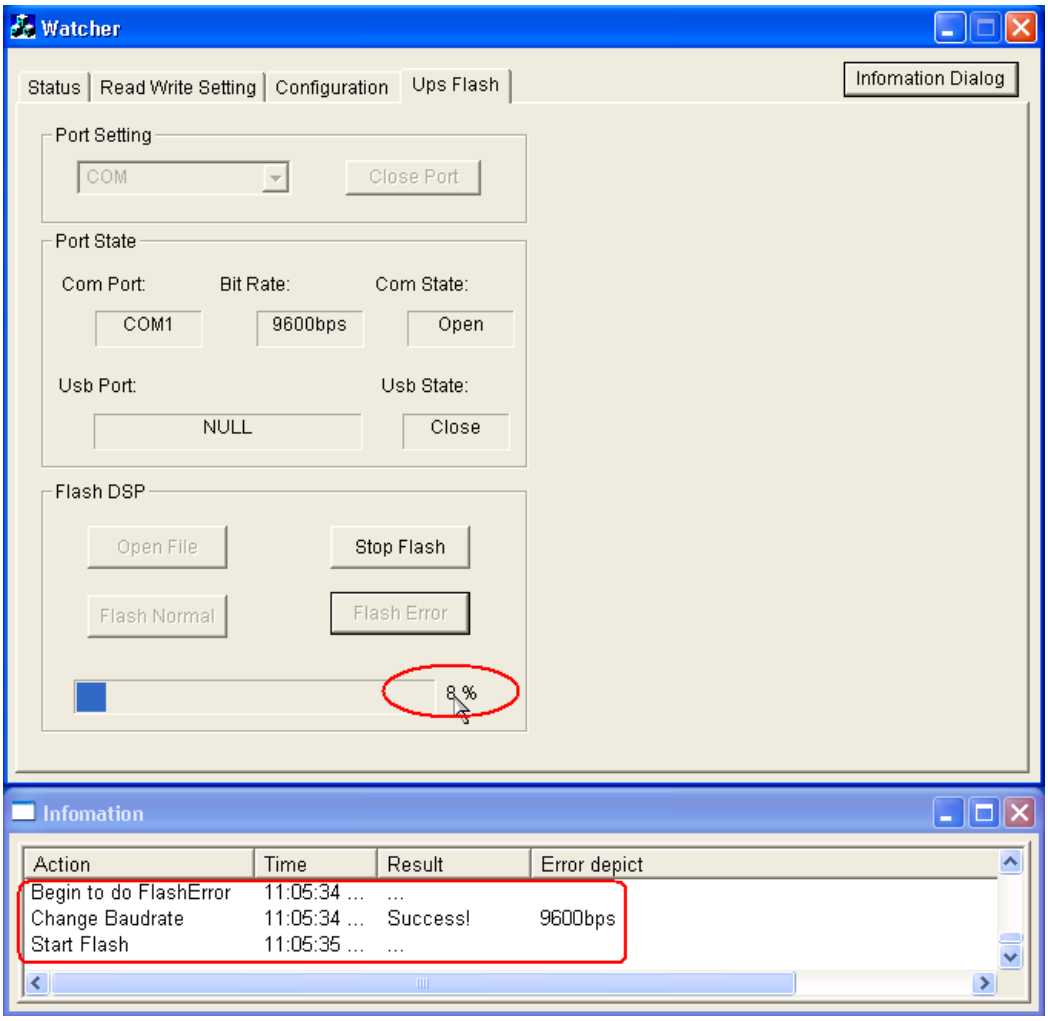
4. Double click the right Firmware, then it will show:

Note: Before update the Firmware, please recheck the Firmware File is the right one.

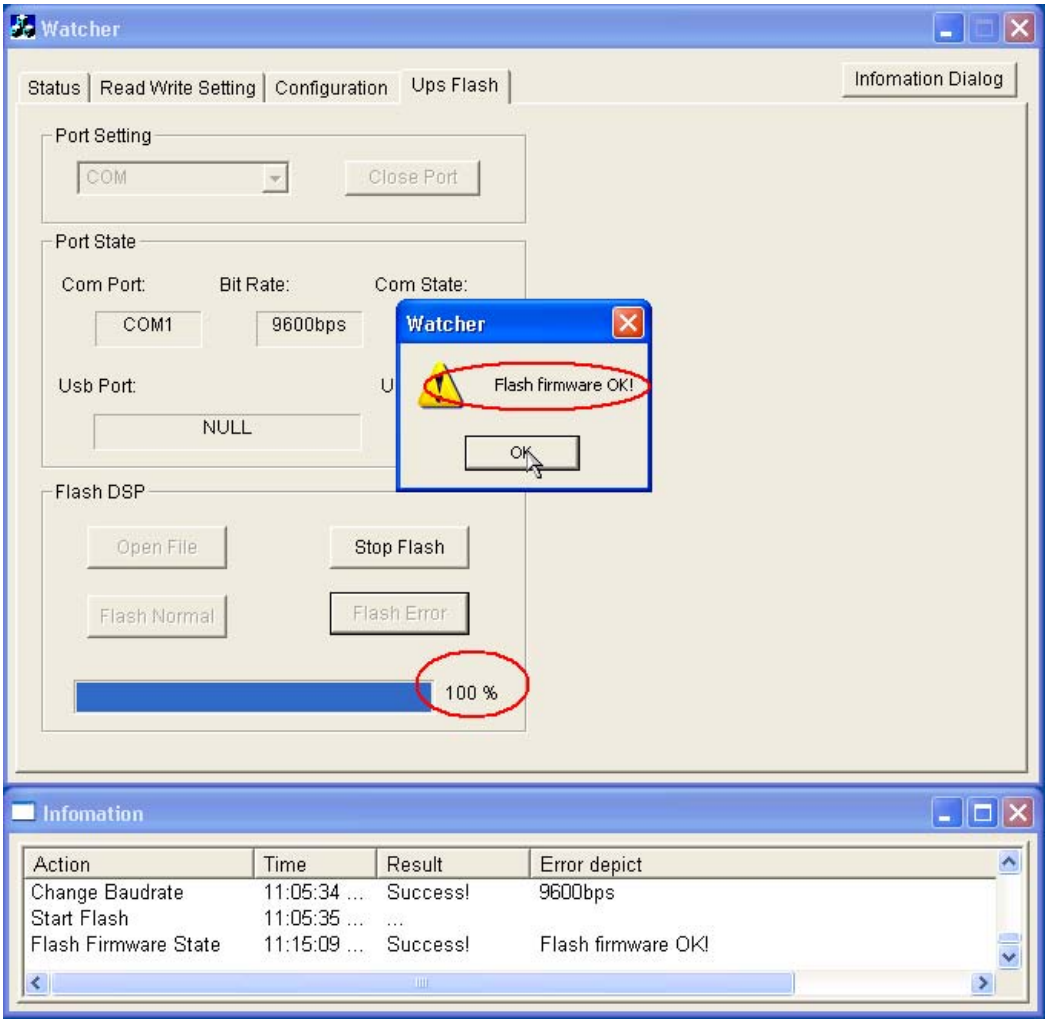


5. Click  , then the flash will begin:


Watcher
Status
Read Write Setting
Configuration
Ups Flash
Infomation Dialog
Port Setting
COM
Close Port
Port State
Com Port:
Bit Rate:
Com State:
COM1
9600bps
Open
Usb Port:
Usb State:
NULL
Close
Flash DSP
Open File
Stop Flash
Flash Normal
Flash Error
0 %
Infomation
Action
Time
Result
Error depict
Bootloader Reset
11:03:50 ...
Success!
Bootloader has been reseted.
Open .s File
11:04:15 ...
Success!
E:\Documents and Settings\yufj\Desktop\Service To
Read .s File
11:04:15 ...
Success!
2392 lines



6. If the updating is OK，it will show next picture：



Then click OK to end the firmware updating.

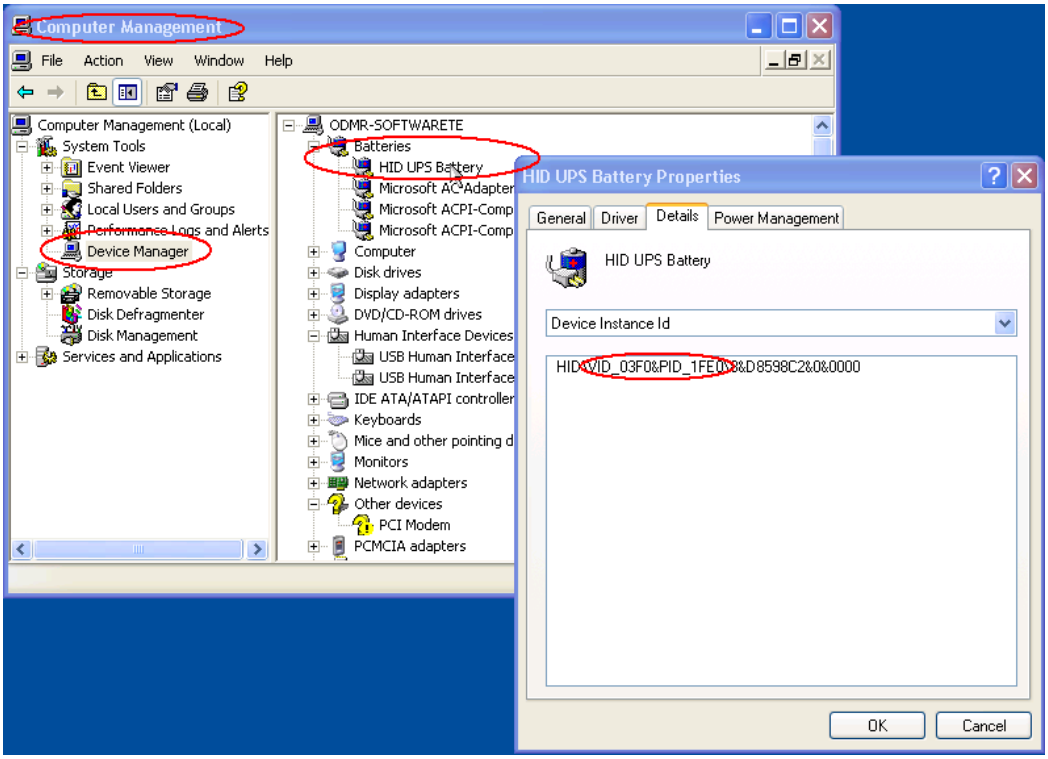
Return to Catalog

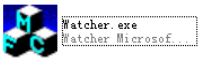
VII. DSP Firmware Updating (USB) – Flash Normal

Flash Normal is used to flash DSP firmware when the UPS works at normal state.
(UPS's AC input is ok, DSP firmware works well, and UPS on standby mode).

1. Connect PC and UPS use USB cable, make the UPS is on standby mode.

2. If the USB communication is normal, the Device Manager of OS will show:
Note: Before you do the Flash Normal operation, please insure the communication is OK.

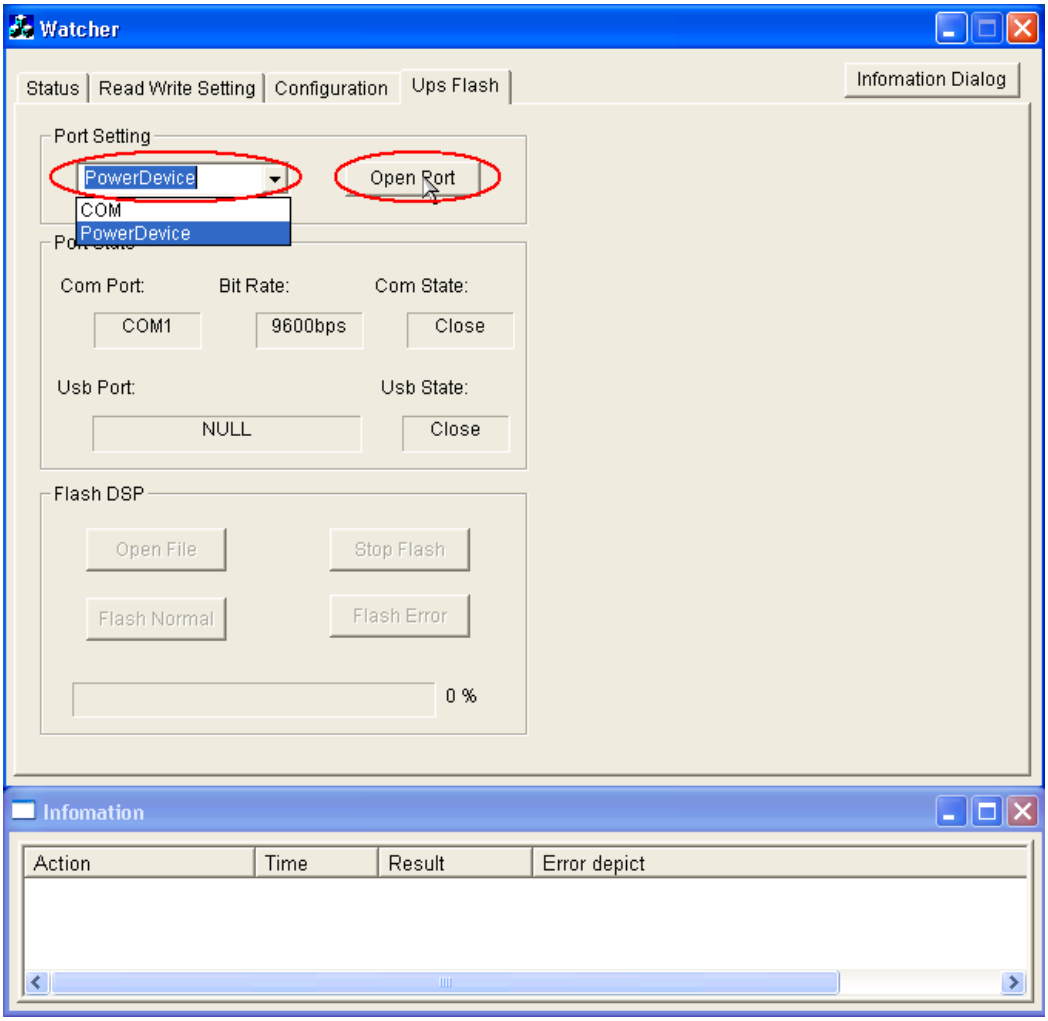


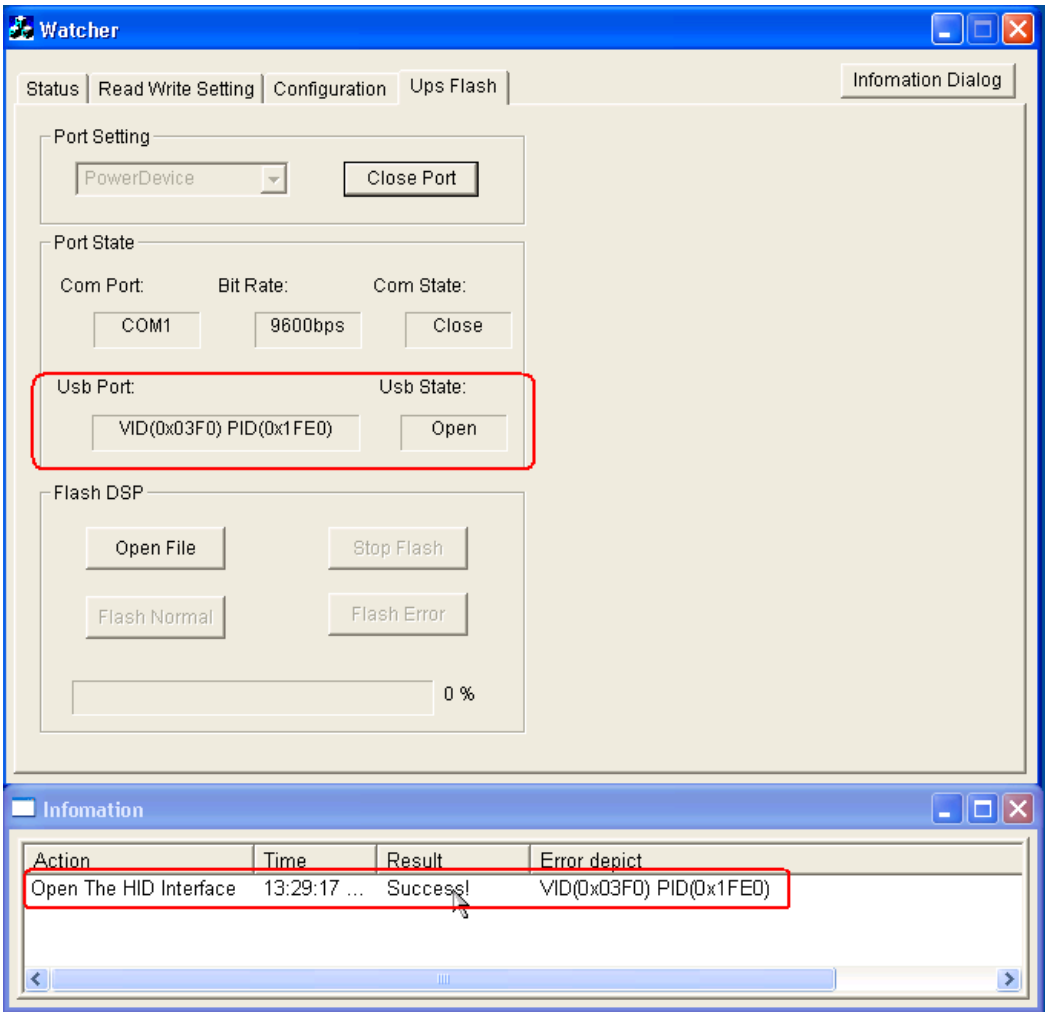
3. Double Click 

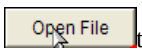
to open Watcher, and press 

tab to enter the Ups Flash Page.

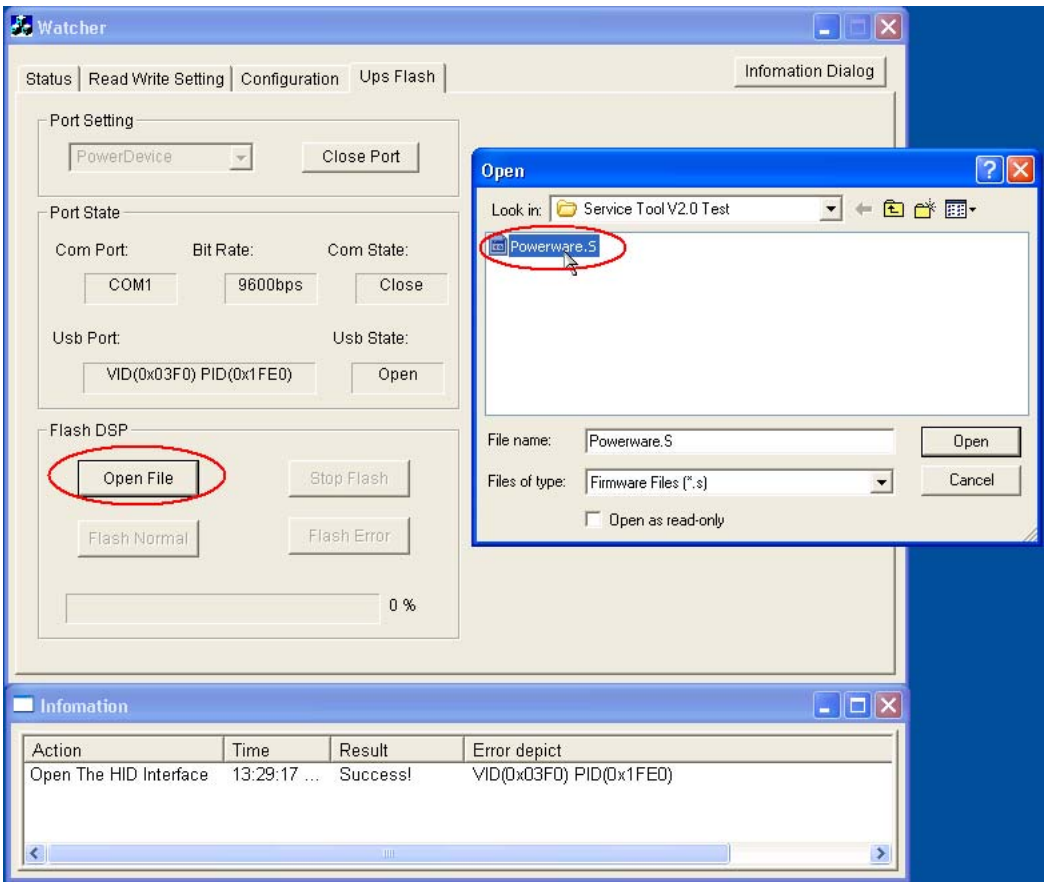
4. Choose PowerDevice Port and press 


Watcher
Status
Read Write Setting
Configuration
Ups Flash
Infomation Dialog
Port Setting
PowerDevice
COM
PowerDevice
Open Port
Com Port:
Bit Rate:
Com State:
COM1
9600bps
Close
Usb Port:
Usb State:
NULL
Close
Flash DSP
Open File
Stop Flash
Flash Normal
Flash Error
0 %
Infomation
Action
Time
Result
Error depict



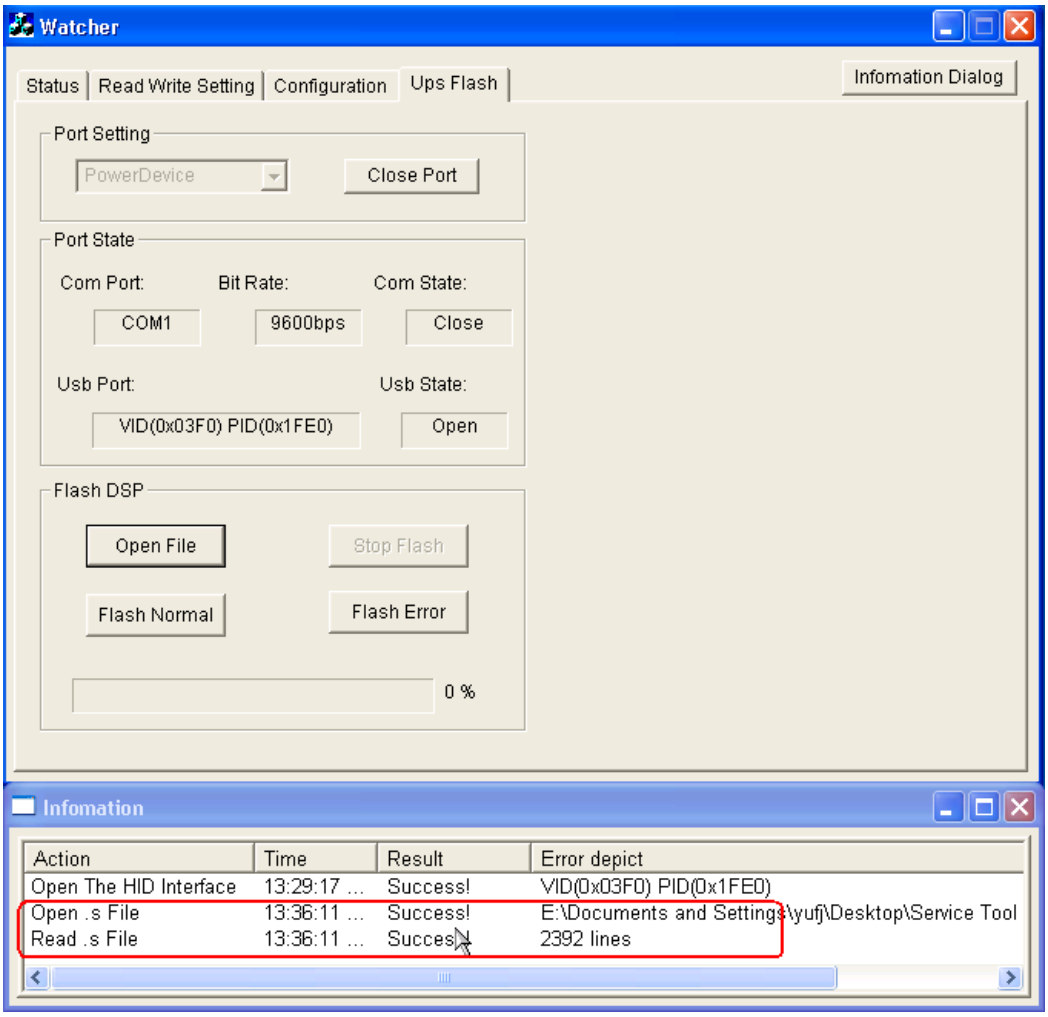
5. Click 

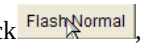
then choose the new DSP firmware：

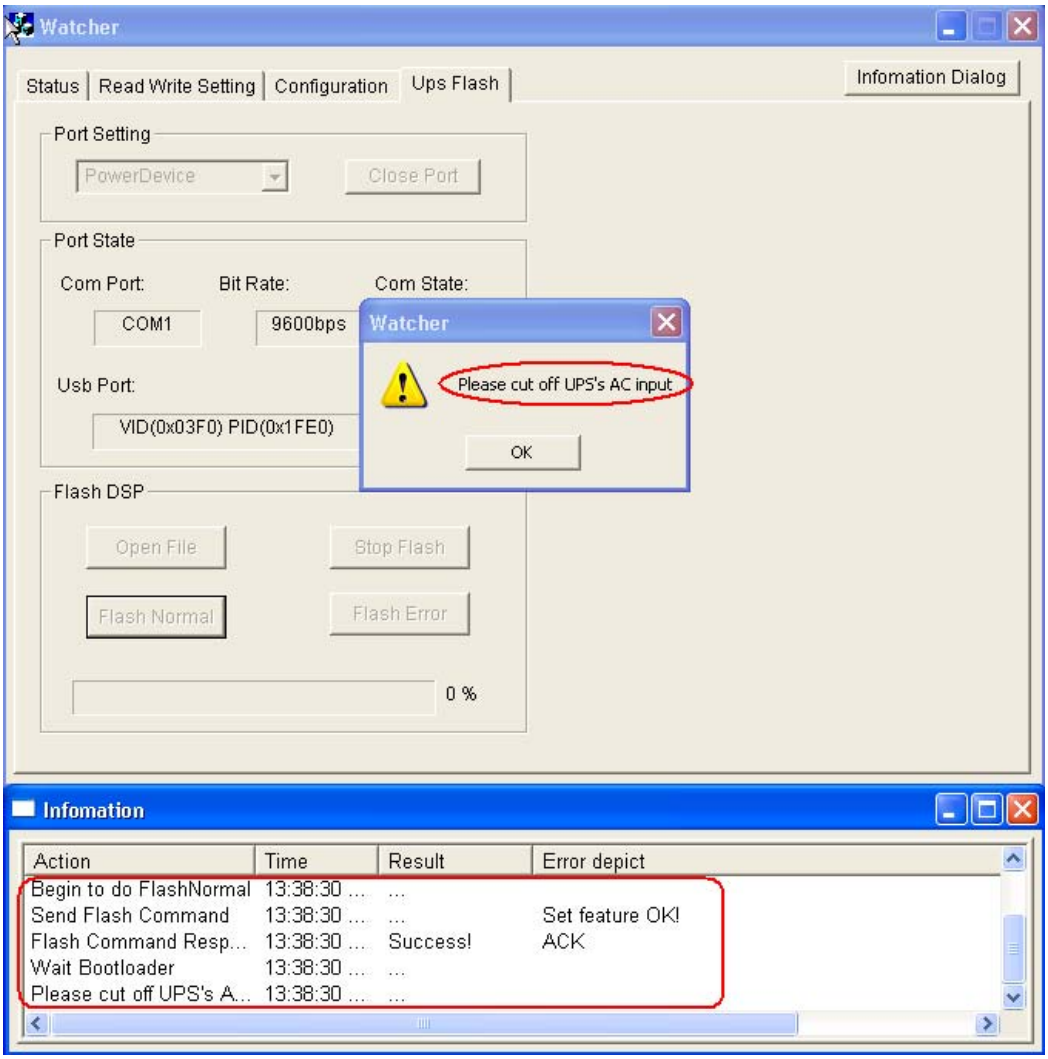


6. Double click the right Firmware, then it will show:

Note: Before update the Firmware, please recheck the Firmware File is the right one.

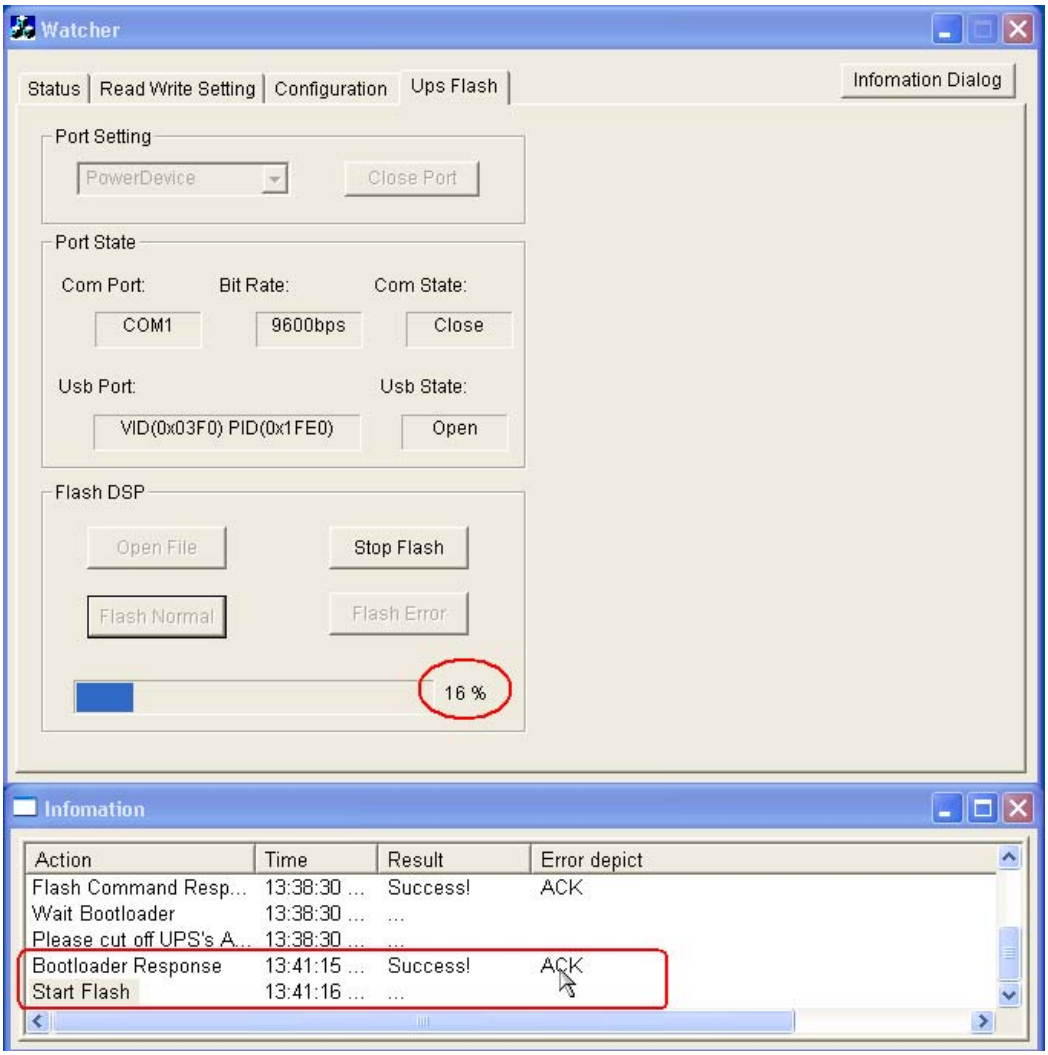


7. Click  , then a Popup Message Box will show

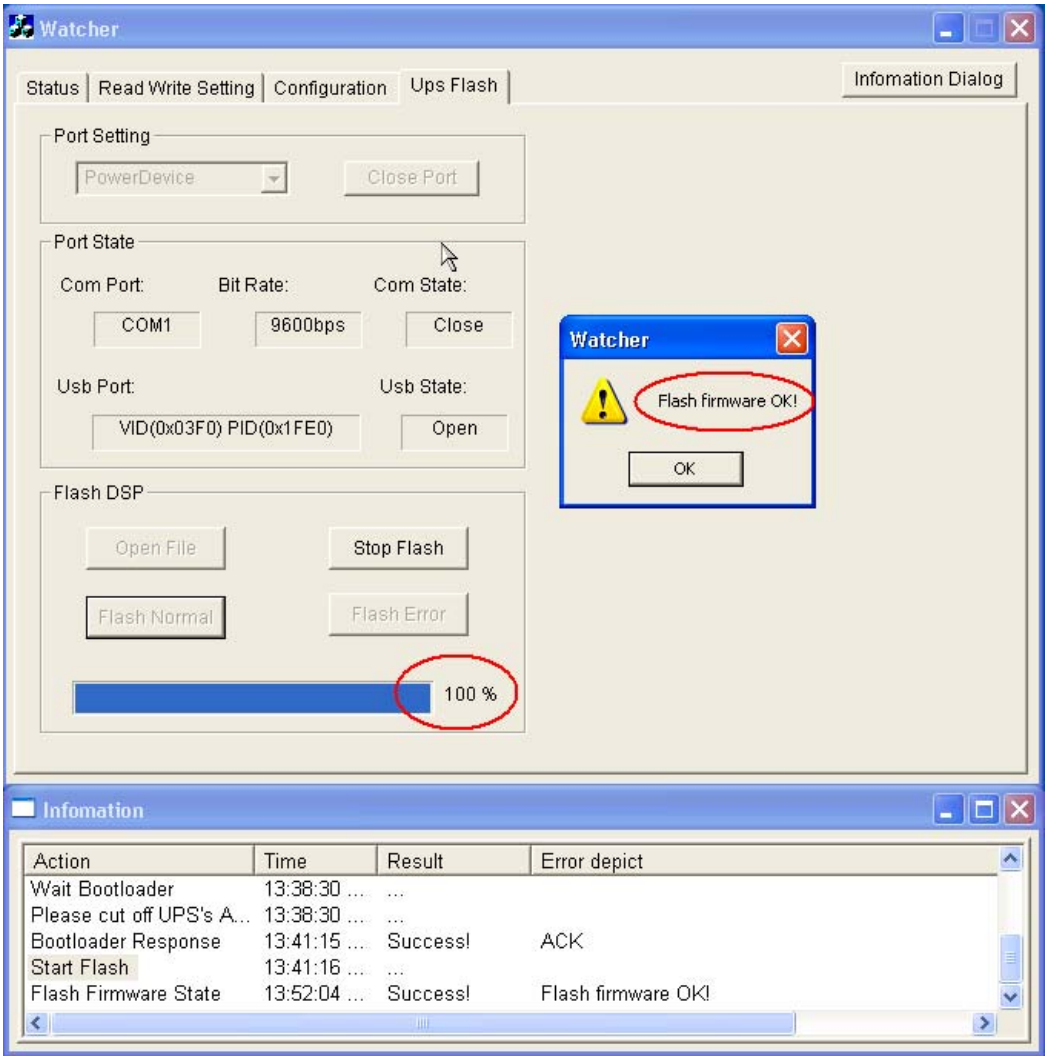


8. Then cut off UPS's AC input, press the OK button of the Popup Message Box in the step above.

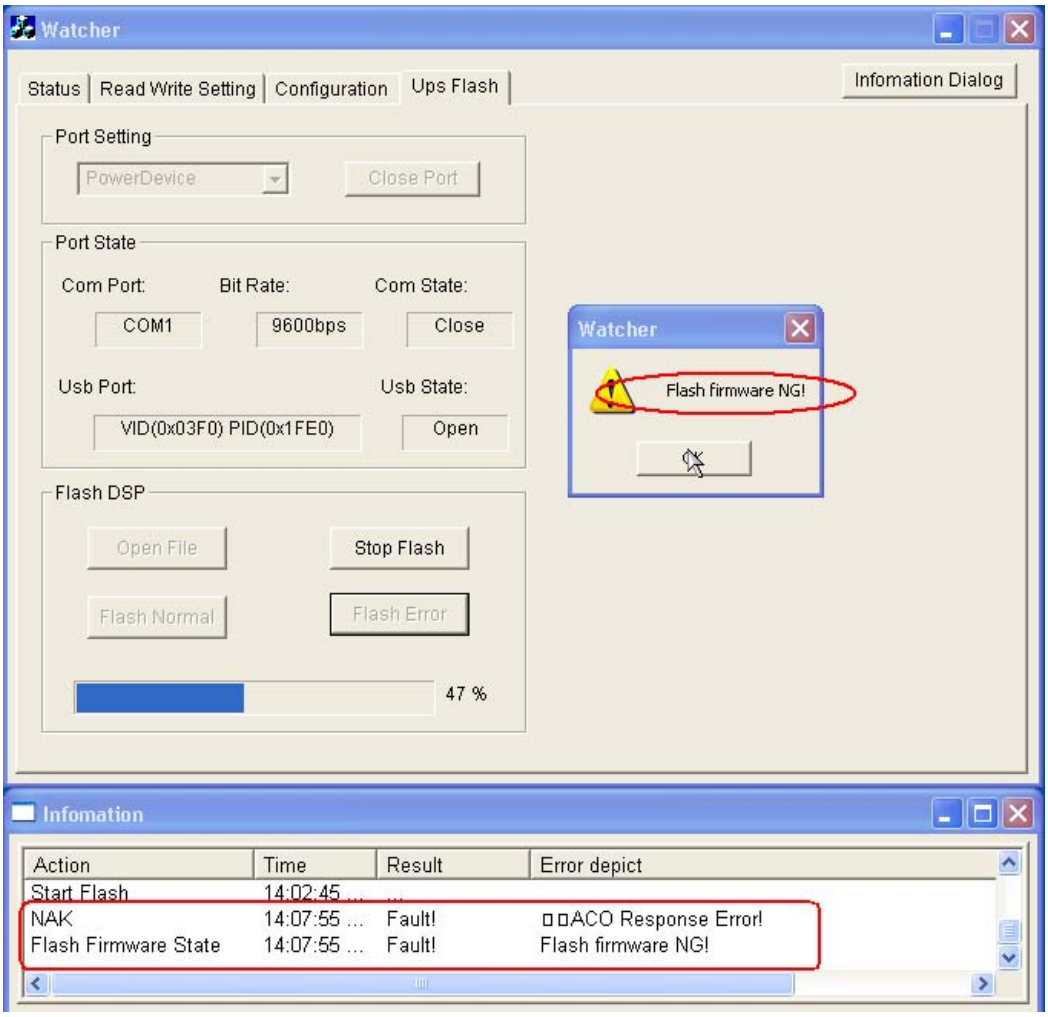
After a few seconds, the flash begins.



9. After updating is OK，it will show next picture：



Note: If the updating is NG ,it will popup “Flash firmware NG!” Message Box, and you should do **Part VIII. DSP Firmware Updating (USB) – Flash Error**.

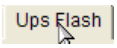


10. Then click OK to end the firmware updating.

Return to Catalog

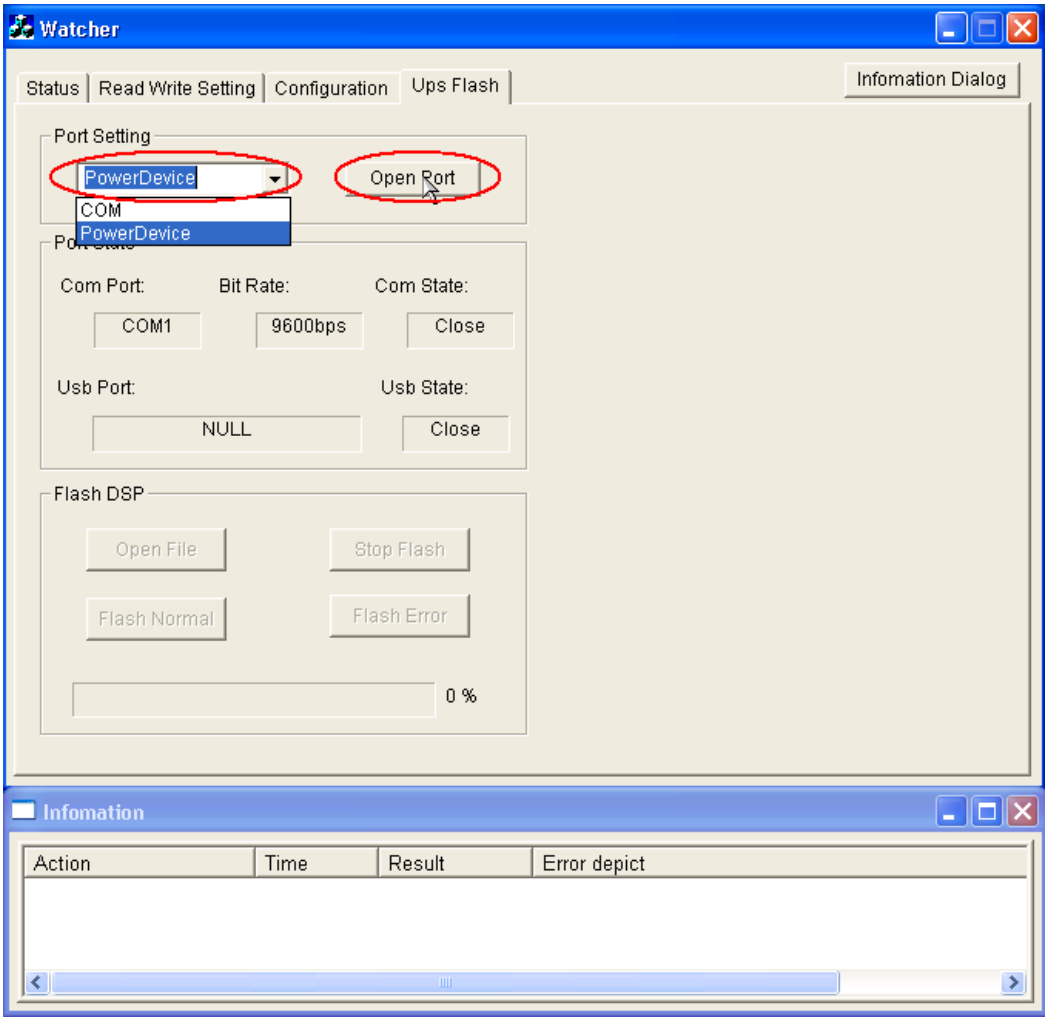
VIII. DSP Firmware Updating (USB) – Flash Error

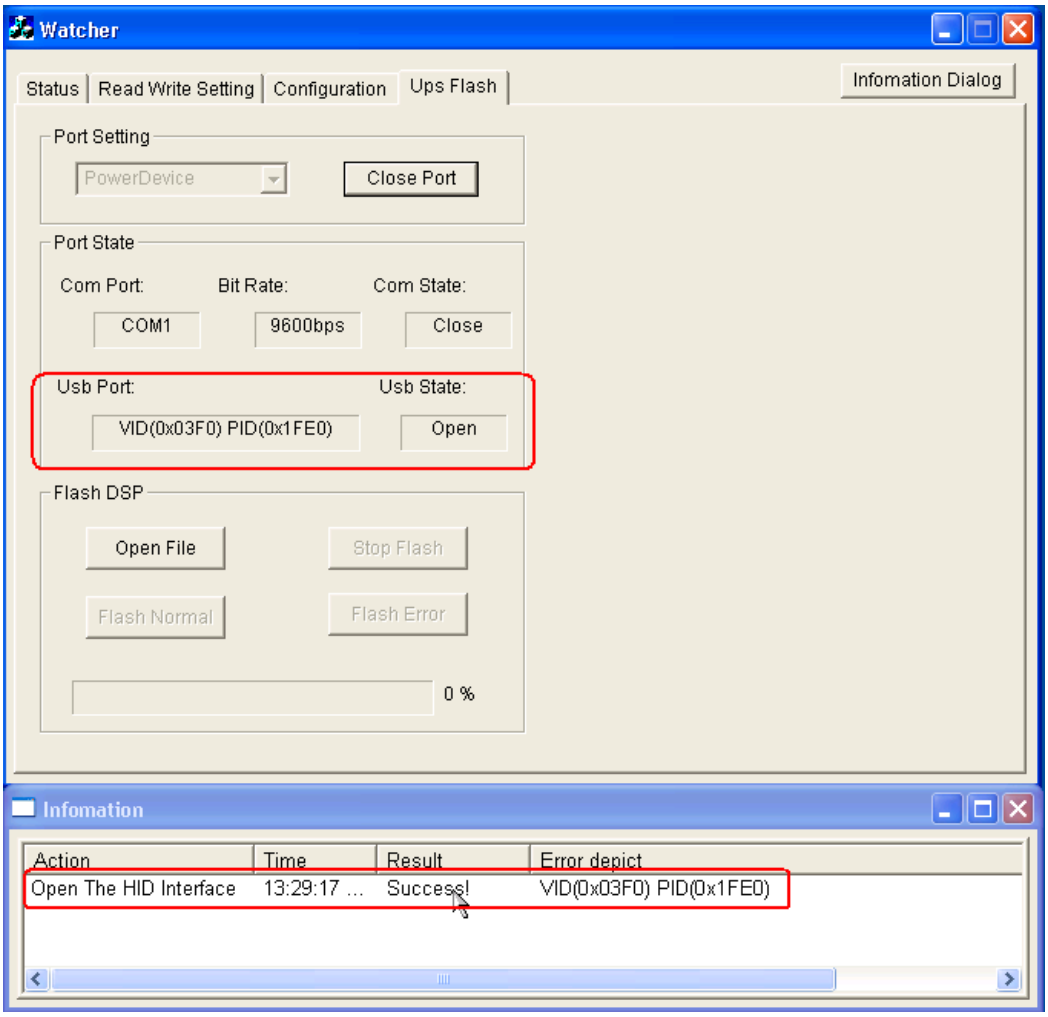
Note: This function is used after "VII. DSP Firmware Updating (USB) – Flash Normal" failed.
If DSP Firmware is NG, the UPS will beep all the time.

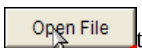
1. If watcher is closed, open it and press 

tab to enter the Ups Flash Page.

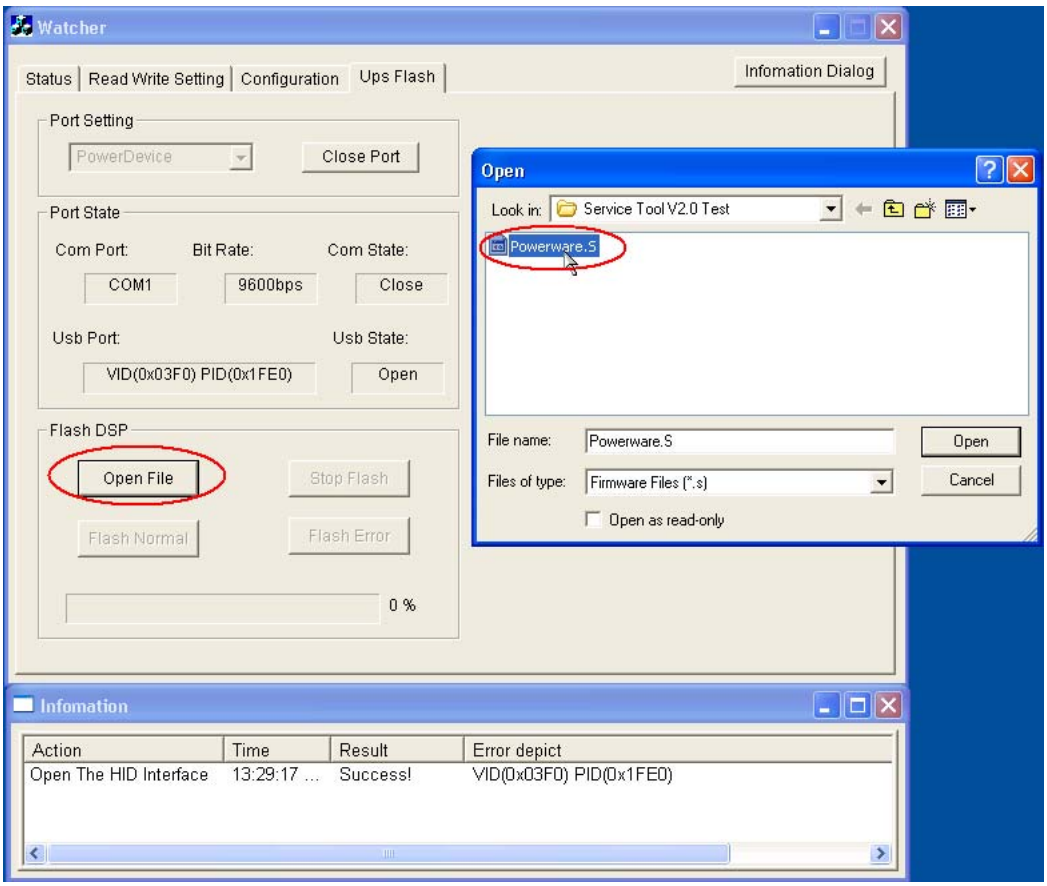
2. Choose PowerDevice Port and press 


Watcher
Status
Read Write Setting
Configuration
Ups Flash
Infomation Dialog
Port Setting
PowerDevice
COM
PowerDevice
Open Port
Com Port:
Bit Rate:
Com State:
COM1
9600bps
Close
Usb Port:
Usb State:
NULL
Close
Flash DSP
Open File
Stop Flash
Flash Normal
Flash Error
0 %
Infomation
Action
Time
Result
Error depict



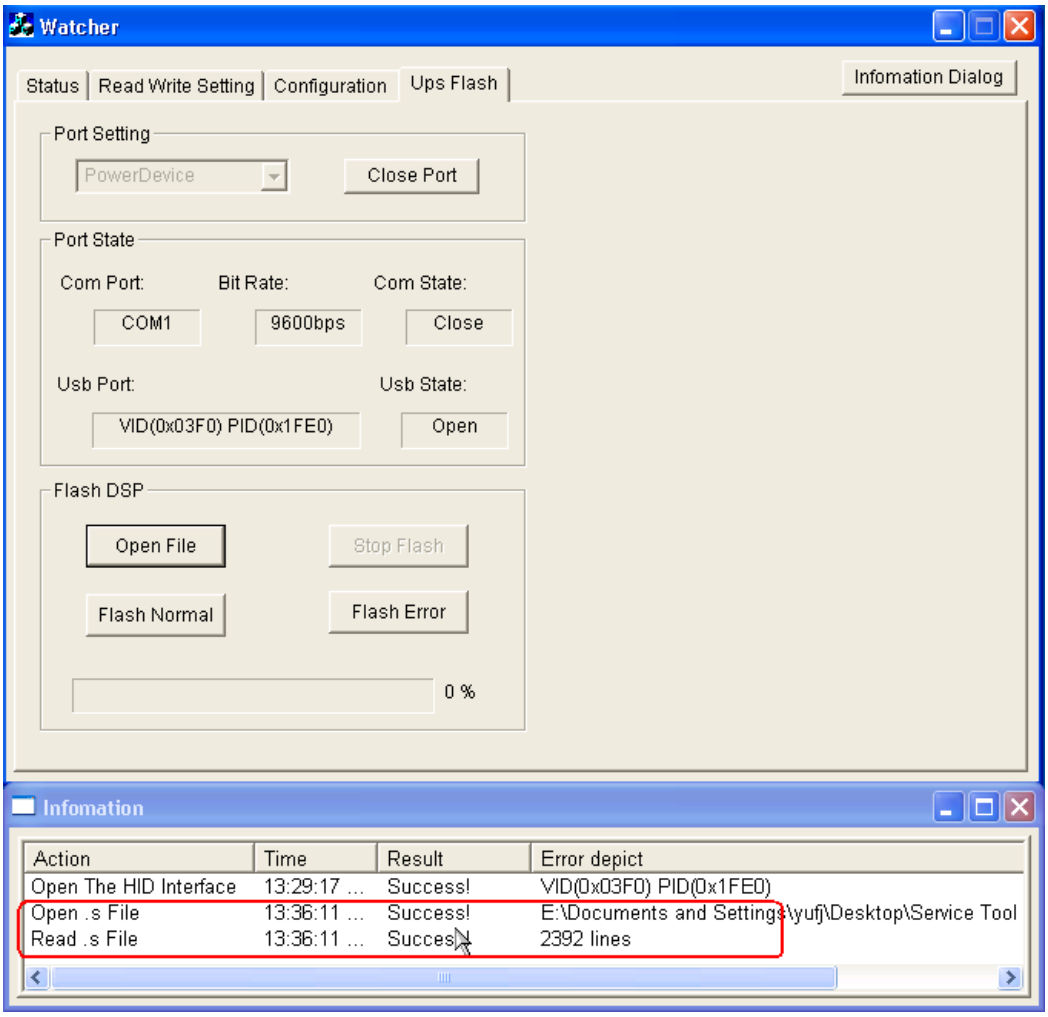
3. Click 

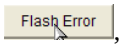
then choose the new DSP firmware：



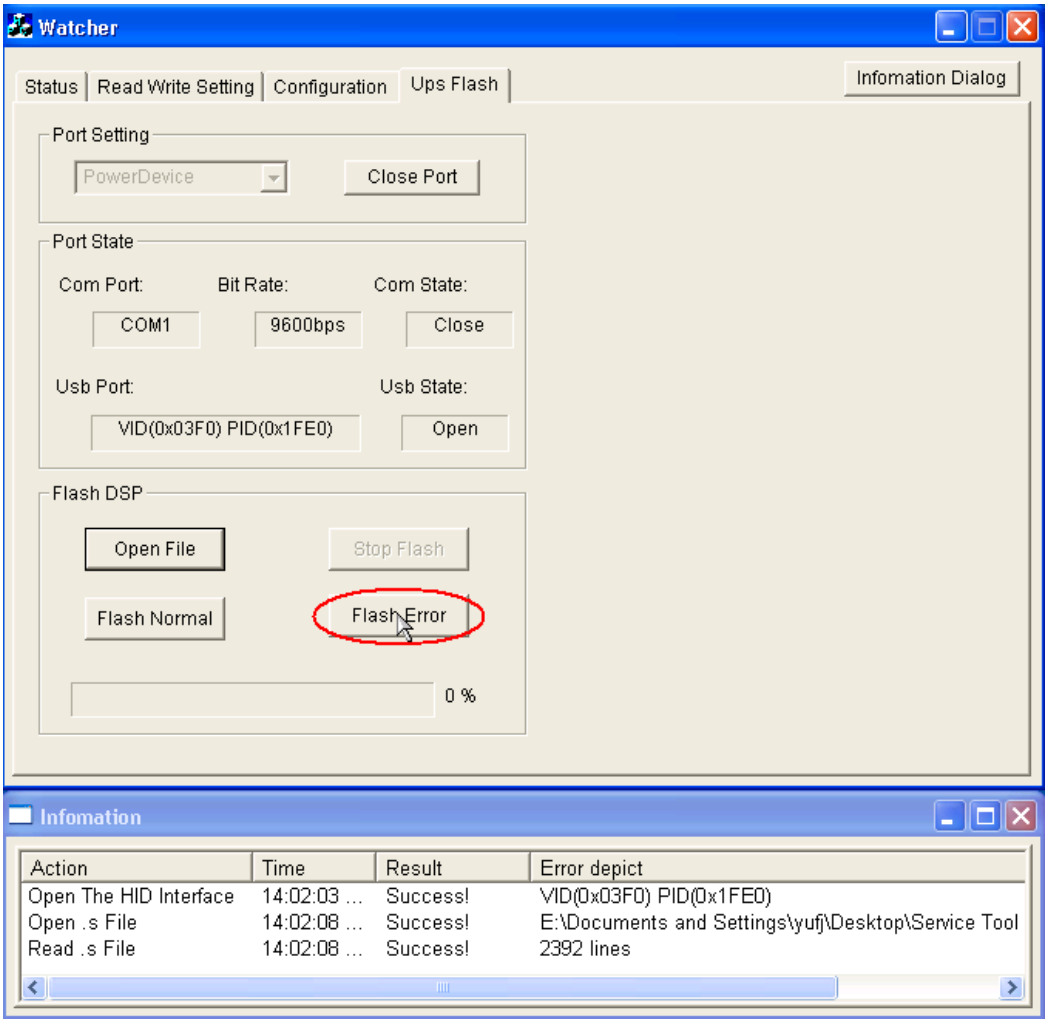
4. Double click the right Firmware, then it will show:

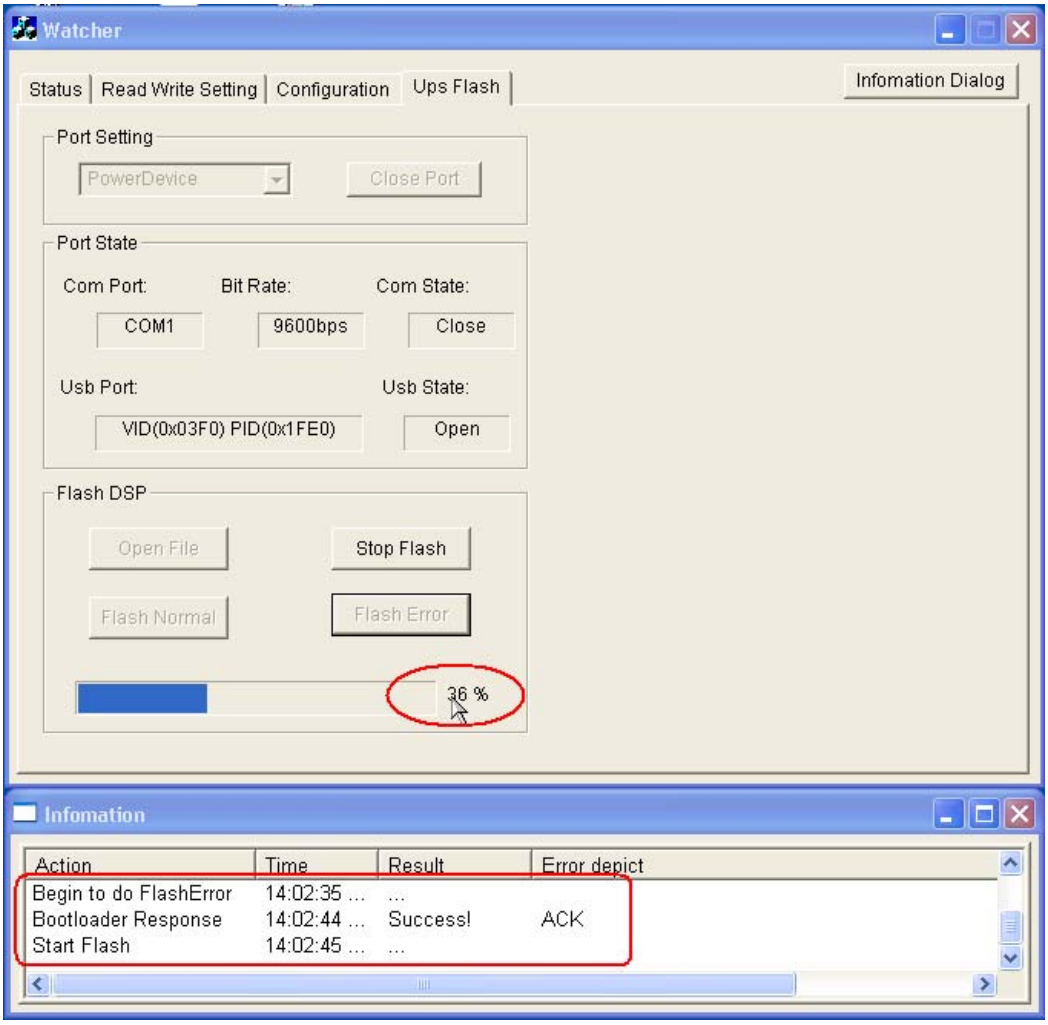
Note: Before update the Firmware, please recheck the Firmware File is the right one.



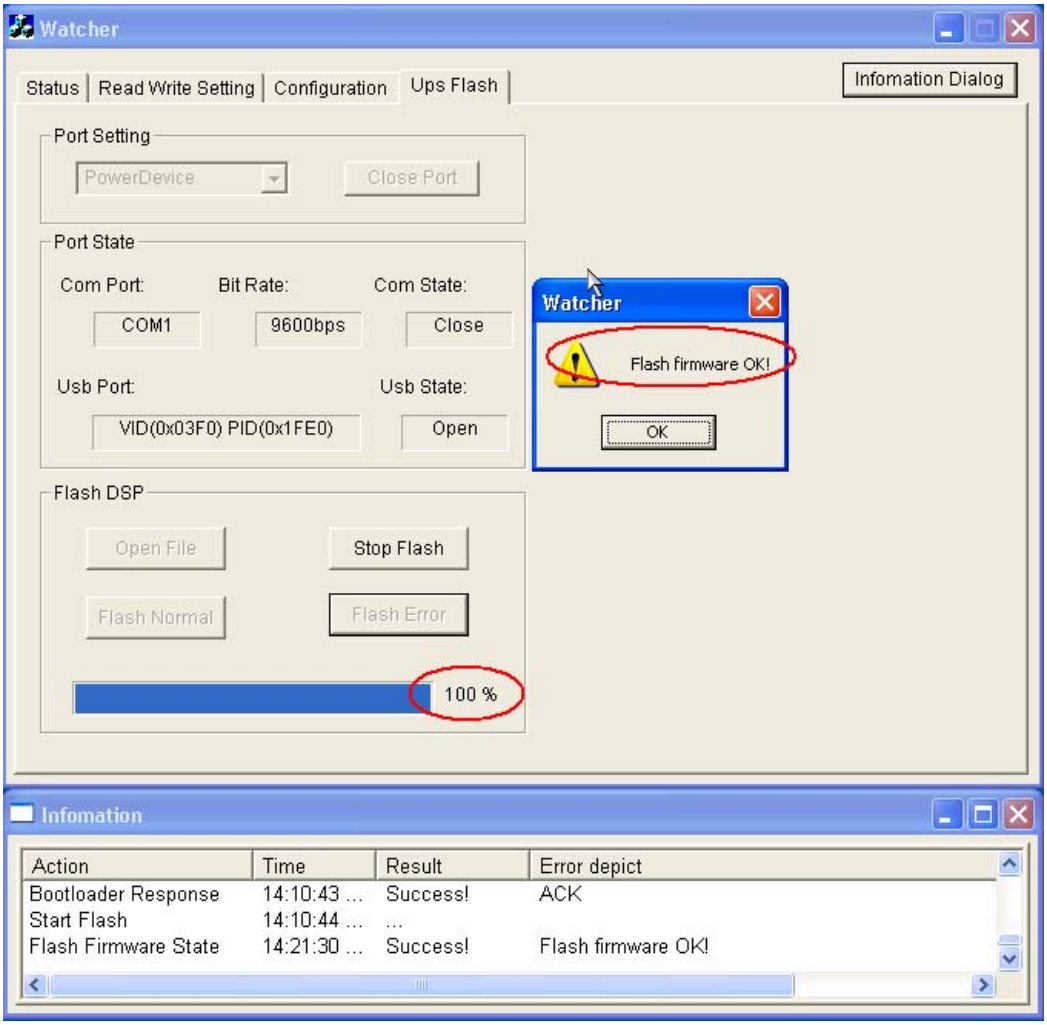
5. Click 

, after a few seconds the flash will begin:


Watcher
Status
Read Write Setting
Configuration
Ups Flash
Infomation Dialog
Port Setting
PowerDevice
Close Port
Port State
Com Port:
Bit Rate:
Com State:
COM1
9600bps
Close
Usb Port:
Usb State:
VID(0x03F0) PID(0x1FE0)
Open
Flash DSP
Open File
Stop Flash
Flash Normal
Flash Error
0 %
Infomation
Action
Time
Result
Error depict
Open The HID Interface
14:02:03 ...
Success!
VID(0x03F0) PID(0x1FE0)
Open .s File
14:02:08 ...
Success!
E:\Documents and Settings\yufj\Desktop\Service Tool
Read .s File
14:02:08 ...
Success!
2392 lines



6. After updating is OK，it will show next picture：



Return to Catalog

IV. Error summary

Note: This Part describes the error information corresponding with Watcher.

TBD

Return to Catalog

9130 SPARE PART LIST

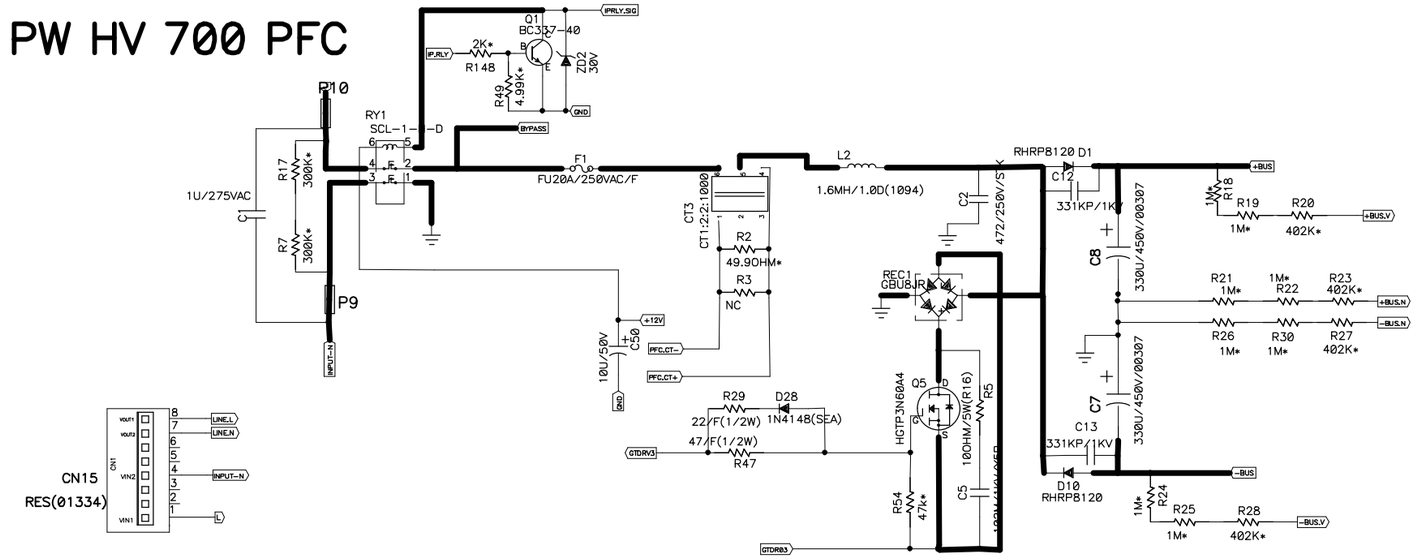
TOWER MODELS 700 - 3000 VA 1/2

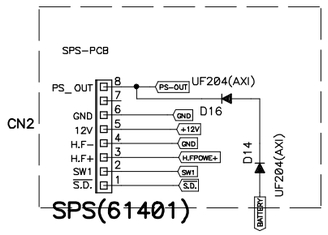
PART NUMBER	DESCRIPTION
744-00942-0X	PCBAS Communication board 9130/700-3000
744-83405-0X	PCBAS Control board 9130/700-3000
744-02871-0X	PCBAS Display board 9130/700-3000
744-02863-0X	PCBAS EPO/relay board 9130/700-3000
744-02895-0X	Input EMI filter for 9130/700
744-00940-0X	Input EMI filter for 9130/1000
744-00939-0X	Input EMI filter for 9130/1500
744-02869-0X	Input EMI for 9130/2000-3000
744-02232-0X	O/P EMI for 9130/700
744-02867-0X	O/P EMI for 9130/2000-3000
744-00953-0X	Relay board(power share) 9130/1000-1500
744-00947-0X	Relay board for 9130/2000-3000
744-02663-0X	PCBAS PSDR 9130/700
744-02662-0X	PCBAS PSDR 9130/1000
744-02661-0X	PCBAS PSDR 9130/1500
744-02345-0X	PCBAS PSDR 9130/2000
744-02346-0X	PCBAS PSDR 9130/3000
744-A0393-0X	6cm fan 9130/1500
744-A0392-0X	8cm fan 9130/700-1500
744-A0401-0X	8cm fan 9130/2000-3000
744-A0390-0X	Front panel w LCD panel 9130/700-1500
744-A0391-0X	Front panel w LCD panel 9130/2000-3000

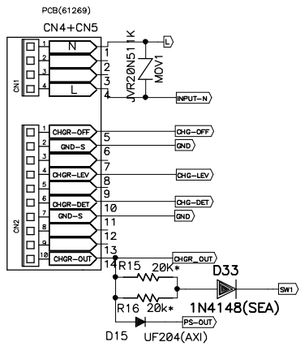
RACK MODELS 1000 - 3000 VA

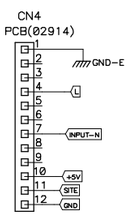
PART NUMBER	DESCRIPTION	2/2
744-00942-0X	PCBAS Communication board 9130/1000-3000	
744-83405-0X	PCBAS Control board 9130/1000-3000	
744-00938-0X	PCBAS Display board 9130/1000-3000	
744-02863-0X	PCBAS REPO/relay board 9130/1000-3000	
744-02911-0X	Input EMI filter for 9130/1500	
744-00940-0X	Input EMI filter for 9130/1000	
744-00944-0X	Input EMI for 9130/2000-3000	
744-00936-0X	O/P EMI for 9130/2000-3000	
744-00953-0X	PCBAS Relay board(power share) 9130/1000-1500	
744-00947-0X	PCBAS Relay board for 9130/2000-3000	
744-02662-0X	PCBAS PSDR 9130/1000	
744-02661-0X	PCBAS PSDR 9130/1500	
744-02340-0X	PCBAS PSDR 9130/2000	
744-02341-0X	PCBAS PSDR 9130/3000	
744-A0393-0X	FAN 6cm 9130/1500	
744-A0392-0X	FAN 8cm 9130/1000-1500	
744-A0401-0X	FAN 8cm 9130/2000-3000	
744-A0388-0X	Front panel left 9130/1000-3000 RM	
744-A0389-0X	Front panel right w LCD panel 9130/1000-1500 RM	
744-A0406-0X	Front panel right w LCD panel 9130/2000-3000 RM	
744-A0409-0X	Accessory kit 9130/1000-1500 RM	
744-A0410-0X	Accessory kit 9130/2000 RM	
744-A0411-0X	Accessory kit 9130/3000 RM	

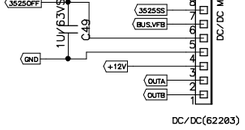
PW HV 700 PFC

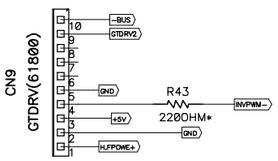


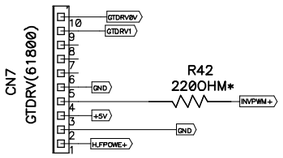


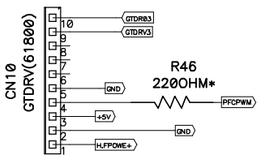


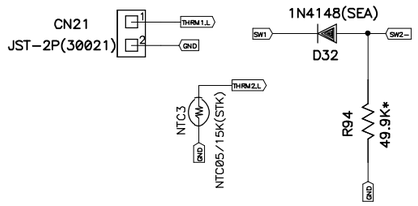


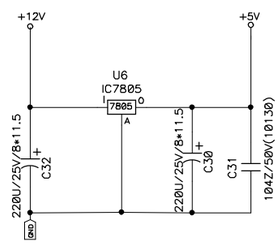


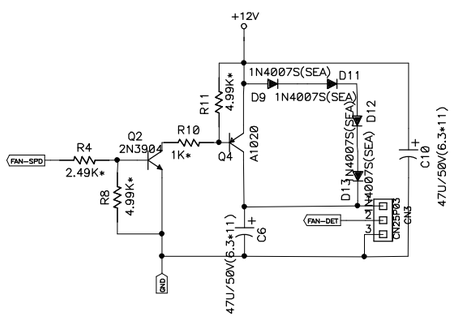


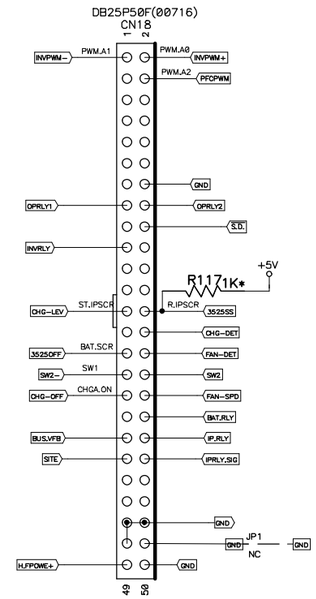


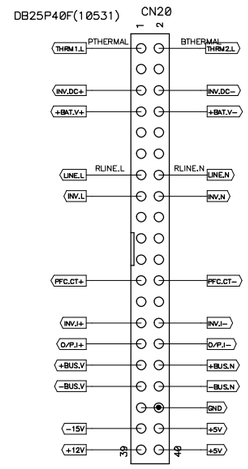


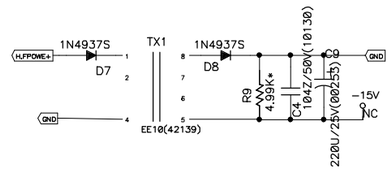






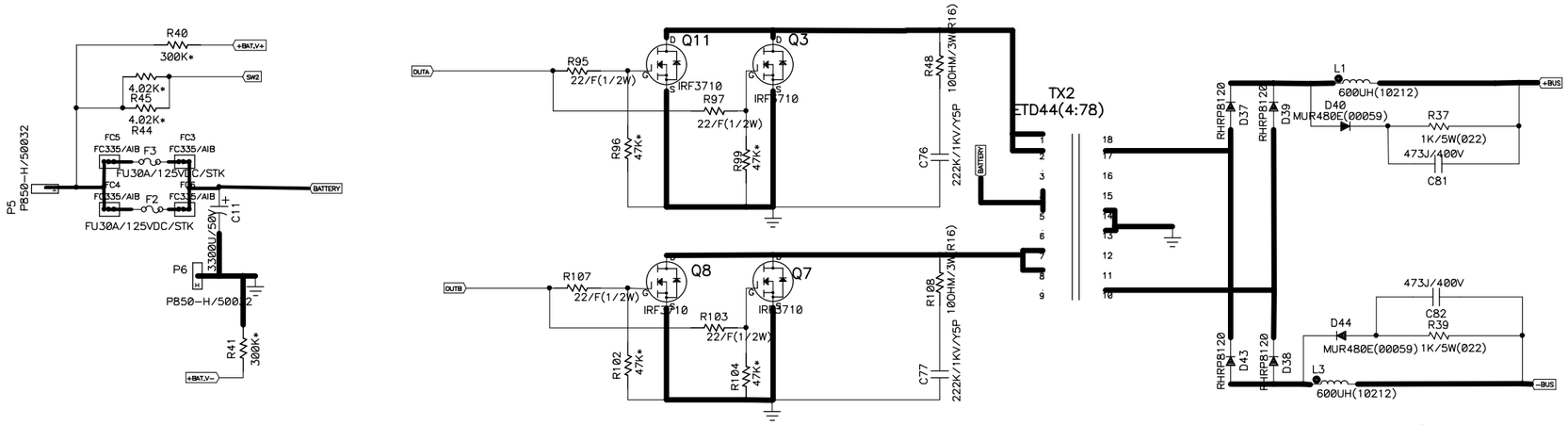




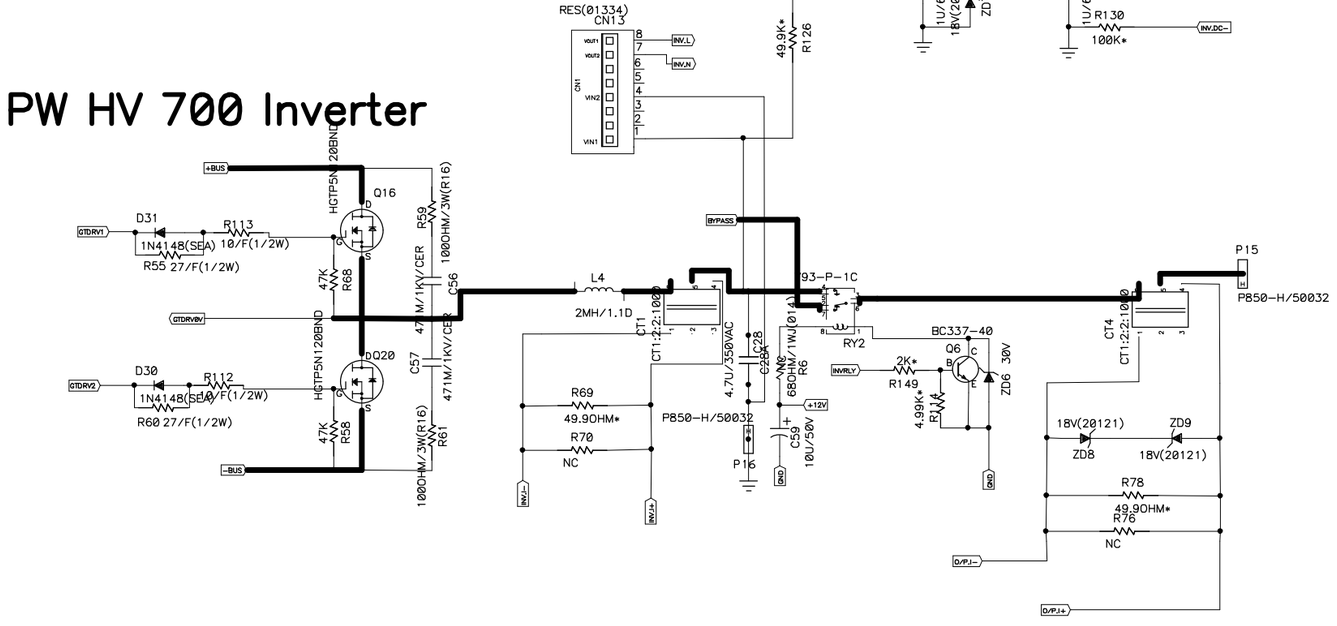


PHOENIXTEC GROUP	REVISE:01P-A A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02663-01P	Sheet 1 of 3	Title: PCB'Y PSDR 1033 POWERWARE GP	Drawn: xiao chao 2008/6/16	Designer: Zhou wei 2008/6/16	Checked: Zhou wei 2008/6/16	Approved: Dong zhihui 2008/6/16
710-02663-01P / TP710-02663-01P	098-02663-xx					

PW HV 700 DC/DC



PW HV 700 Inverter



A

PHOENIXTEC GROUP	REVISE:01P-A A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02663-01P	Sheet 2 of 3	Title: PCB'Y PSDR 1033 POWERWARE GP	Drawn: xiao chao 2008/6/16	Designer: Zhou wei 2008/6/16	Checked: Zhou wei 2008/6/16	Approved: Dong zhihui 2008/6/16
710-02663-01P / TP710-02663-01P	098-02663-xx					

JP22 JP900(0.6)
JP25 JP700(0.6)
JP58 JP600(0.6)
JP69 JP600(0.6)
JP73 JP600(0.6)
JP101 JP600(0.6)
JP106 JP600(0.6)
P7 JC-10-106JNNRS
JP18 BYPASS JP2500(0.6)
JP38 BYPASS JP2500(0.6)
JP11 JP1600(0.6)
JP34 JP600(0.6)
JP55 JP600(0.6)
JP59 JP600(0.6)
JP2 JP600(0.6)
JP24 JP600(0.6)
JP77 JP600(0.6)
JP117 JP600(0.6)
JP118 JP600(0.6)
JP126 JP600(0.6)
JP12 JP1500(0.6)
JP92 JP700(0.6)
JP67 JP700(0.6)
JP81 JP700(0.6)
JP86 JP800(0.6)
JP79 JP700(0.6)
JP116 JP700(0.6)
JP74 JP1600(0.6)
JP23 JP900(0.6)
JP17 JP900(0.6)
JP44 JP900(0.6)
JP100 JP900(0.6)
JP57 JP800(0.6)
JP60 JP800(0.6)
JP61 JP800(0.6)
JP68 JP800(0.6)
JP76 JP800(0.6)
JP102 JP800(0.6)
JP70 JP3300(1.0)
JP88 JP1500(0.6)
JP75 JP1000(0.6)
JP125 JP900(0.6)
JP121 JP1600(0.6)
JP123 JP1500(0.6)
JP46 JP1500(0.6)
JP50 JP1500(0.6)
JP122 JP1500(0.6)
JP120 JP1500(0.6)
JP20 JP1500(0.6)
JP21 JP1500(0.6)
JP45 JP700(0.6)
JP52 JP1000(0.6)
JP62 JP900(0.6)
JP66 JP600(0.6)
JP19 JP1100(0.6)
JP16 JP700(0.6)
JP29 JP1000(0.6)
JP31 JP1000(0.6)
JP49 JP700(0.6)
JP53 JP1000(0.6)
JP54 JP1000(0.6)
JP63 JP1000(0.6)
JP64 JP1000(0.6)
JP65 JP1000(0.6)
JP72 JP1000(0.6)
JP51 JP1100(0.6)
JP89 JP1000(0.6)
JP107 JP1000(0.6)
JP108 JP1000(0.6)
JP56 JP1100(0.6)
JP80 JP1000(0.6)
JP98 JP1000(0.6)
JP115 JP1000(0.6)
JP119 JP1000(0.6)
JP15 JP1500(0.6)
JP7 JP1300(0.6)
JP71 JP1300(0.6)
JP78 JP1200(0.6)
JP105 JP1200(0.6)
JP124 JP1200(0.6)
JP84 JP1500(0.6)
JP30 JP1700(0.6)
JP32 JP1600(0.6)
JP33 JP1600(0.6)
JP37 JP1600(0.6)
JP113 JP1600(0.6)
JP114 JP1400(0.6)
JP96 JP2500(0.6)
JP93 JP2500(0.6)
JP91 JP2500(0.6)
JP90 JP2500(0.6)
JP87 JP2500(0.6)
JP39 JP1800(0.6)
JP41 JP2100(0.6)
JP47 JP1900(0.6)
JP3 JP2000(0.6)
JP9 JP2000(0.6)
JP10 JP2000(0.6)
JP40 JP2300(0.6)
JP28 JP2000(0.6)
JP42 JP2000(0.6)
JP27 JP2000(0.6)
JP94 JP2000(0.6)
JP95 JP2400(0.6)
JP109 JP600(0.6)
JP110 JP600(0.6)
JP111 JP600(0.6)
JP112 JP600(0.6)
JP35 JP2300(0.6)
JP36 JP2400(0.6)
JP48 JP2400(0.6)
JP43 JP2200(0.6)
JP5 JP2500(0.6)
JP6 JP2500(0.6)
JP8 JP2500(0.6)
JP13 JP2500(0.6)
JP14 JP2500(0.6)
JP26 JP2500(0.6)
JP82 JP2500(0.6)
JP83 JP2500(0.6)
JP4 JP3800(1.0)
JP85 JP2500(0.6)

HSD38 HEAT SINK HS30*10*4(1)
HSD37 HEAT SINK HS30*10*4(1)
HSD39 HEAT SINK HS30*10*4(1)
HSD43 HEAT SINK HS30*10*4(1)
HS3 HEAT SINK NC
P12 JH-8 GND JH-8M3-4P
P11 JH-8 GND JH-8M3-4P
P13 JH-8 JH-8M3-4P

HS1
HEAT SINK
HS62-84
HS(01418)

SCD1 SCREW
SCD10 SCREW
SCD37 SCREW
SCD38 SCREW
SCD39 SCREW
SCD43 SCREW
SCU6 SCREW
SC1HS1 SCREW
SCQ16 SCREW
SCQ20 SCREW
SCQ3 SCREW
SCQ5 SCREW
SCQ7 SCREW
SCQ8 SCREW
SCQ11 SCREW
SCWR1 SCREW
SC2HS1 SCREW
SCREC1 SCREW

WR1
WIRE
NTC(50567)

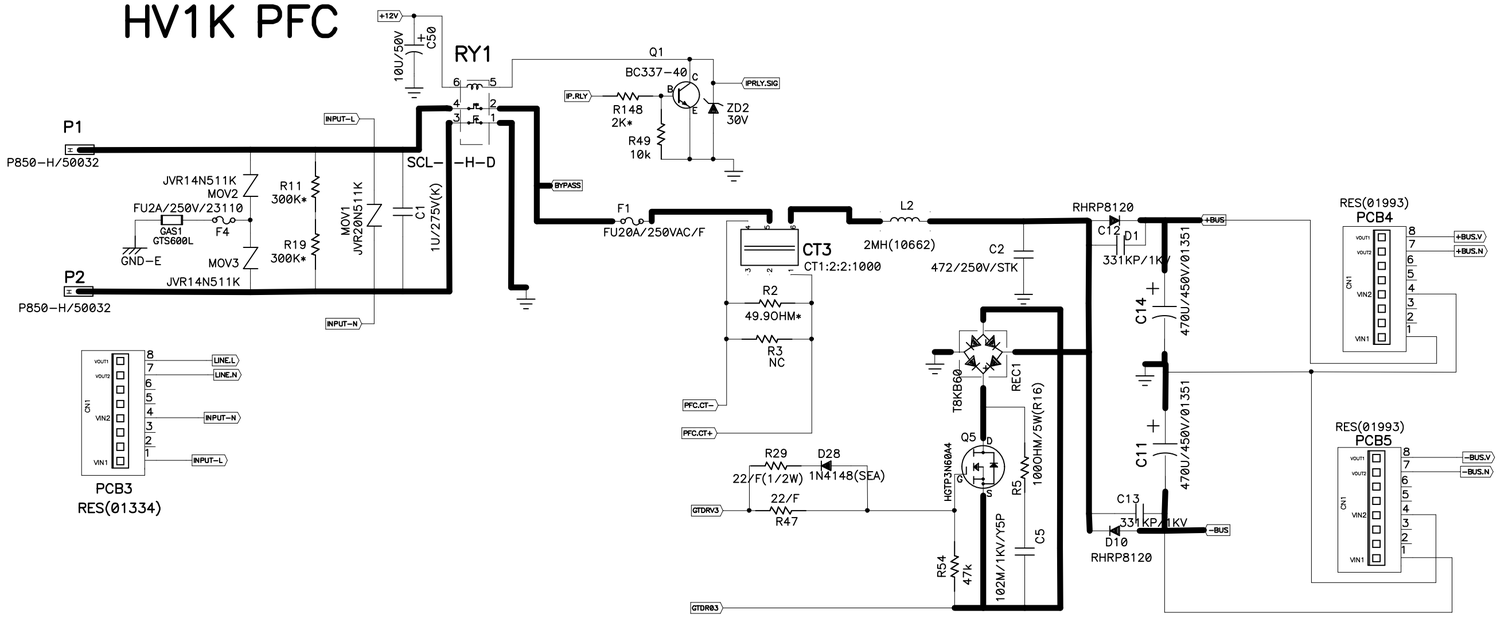
INSSD1 INSS INSS(00678)
INSSD10 INSS INSS(00678)
INSSQ3 INSS INSS(00678)
INSSQ5 INSS INSS(00678)
INSSQ7 INSS INSS(00678)
INSSQ8 INSS INSS(00678)
INSSQ11 INSS INSS(00678)
INSSQ16 INSS INSS(00678)
INSSQ20 INSS INSS(00678)
INSUHS1 INSU INSU(00684)

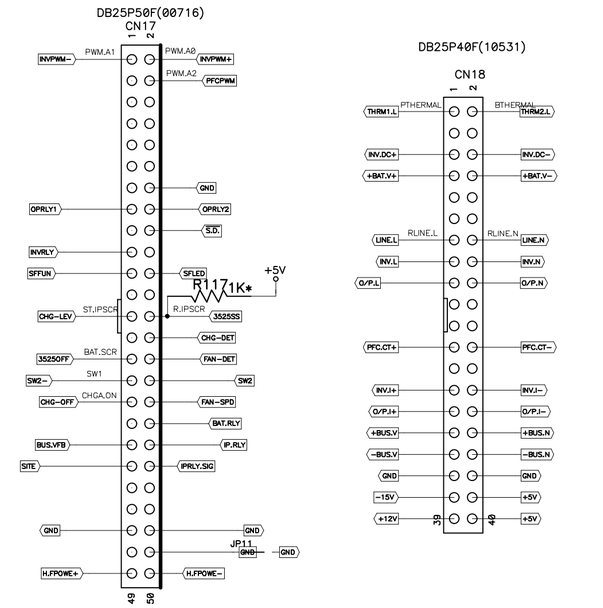
INSBD1 INSB INSB(00004)
INSBD10 INSB INSB(00004)
INSBQ3 INSB INSB(00004)
INSBQ5 INSB INSB(00004)
INSBQ7 INSB INSB(00004)
INSBQ8 INSB INSB(00004)
INSBQ11 INSB INSB(00004)
INSBQ16 INSB INSB(00004)
INSBQ20 INSB INSB(00004)

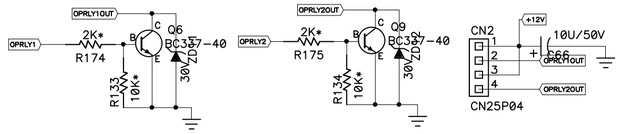
A

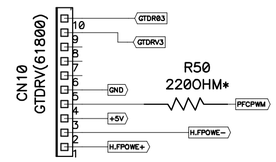
PHOENIXTEC GROUP	REVISE:01P-A A2				CONFIDENTIAL DO NOT COPY
Part No: SK710-02663-01P	Sheet 3 of 3	Title: PCB'Y PSDR 1033 POWERWARE GP	Drawn: xiao chao 2008/6/16	Designer: Zhou wei 2008/6/16	Checked: Zhou wei 2008/6/16	Approved: Dong zhihui 2008/6/16
710-02663-01P / TP710-02663-01P	098-02663-xx					

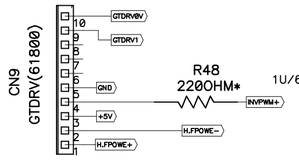
HV1K PFC

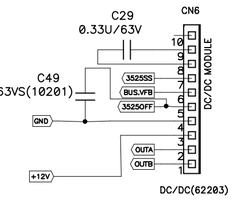


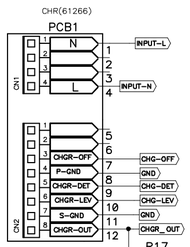


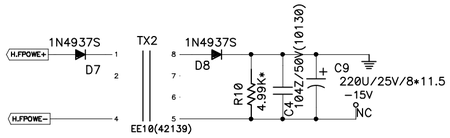


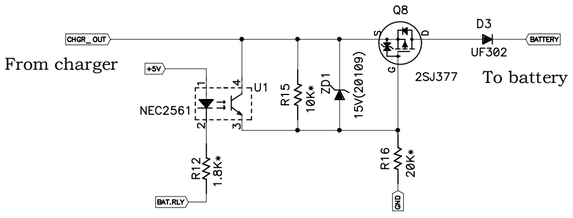


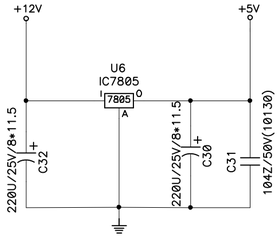


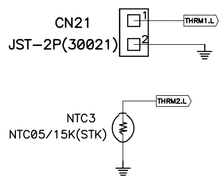


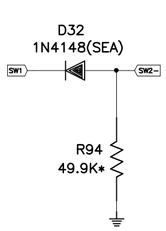


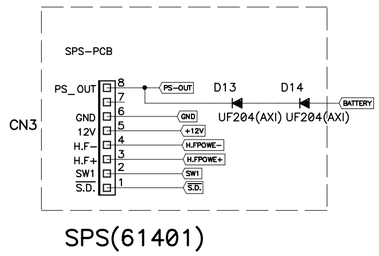


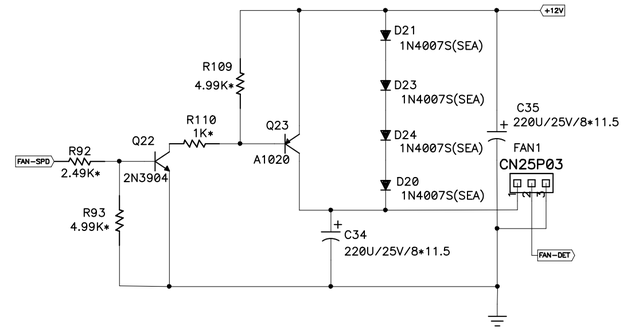










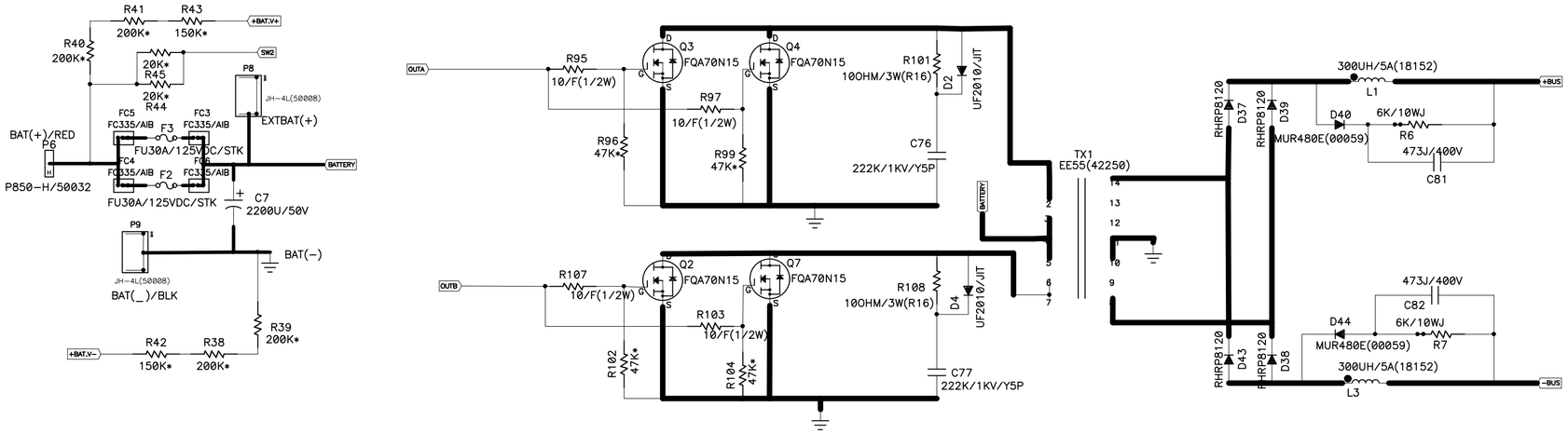


A

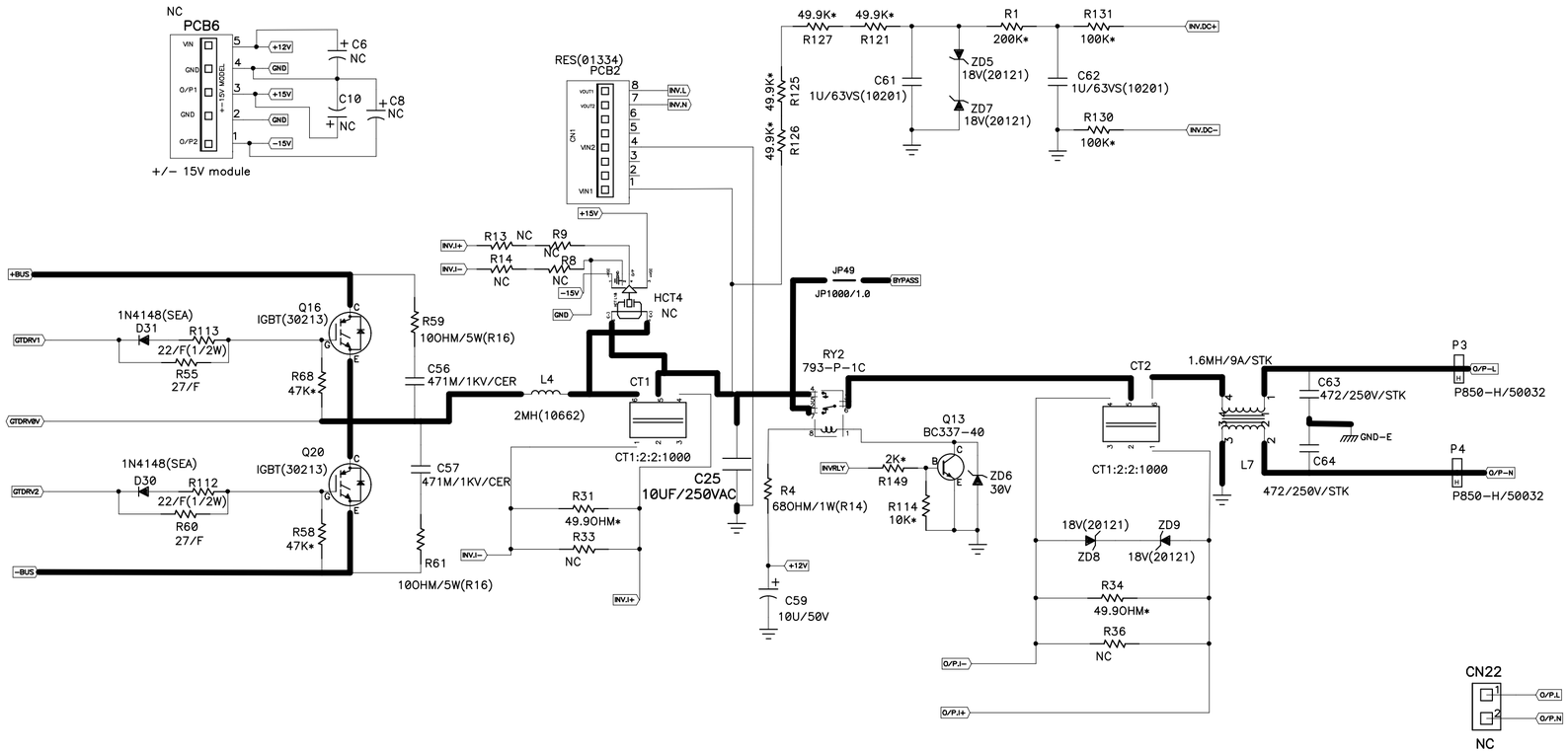
PHOENIXTEC GROUP	REVISE:01P ECN:L1092008 A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02662-01P	Sheet 1 of 3	Title: PCB'Y PSDR 1053 POWERWARE GP	Drawn: CHENLIAN 2008.4.25	Designer:	Checked:	Approved:
710-02662-01P / TP710-02662-01P	098-02662-XX					

TC-RDW-49-23

HV 1K DC/DC



HV 1K Inverter



A

PHOENIXTEC GROUP	REVISE:01P ECN:L1092008 A2				CONFIDENTIAL DO NOT COPY
Part No: SK710-02662-01P	Sheet 2 of 3	Title: PCB'Y PSDR 1053 POWERWARE GP	Drawn: CHENLIAN 2008.4.25	Designer:	Checked:	Approved:
710-02662-01P / TP710-02662-01P	098-02662-XX					

TC-RDW-49-23

HS1
HEAT SINK
HS100-62
HS(00004)

P5
JH-8
JH-8M3-4P

P10
JH-8
JH-8M3-4P

P13
JH-8
JH-8M3-4P

INSBD1
INSB
INSB(00004)

INSBD11
INSB
INSB(00004)

INSBQ5
INSB
INSB(00004)

BEADD1A
CORE(02027)

BEADD1K
CORE(02027)

BEADD10A
CORE(02027)

BEADD10K
CORE(02027)

HSU6 HEAT SINK
HS13-20
HS(01512)

P7
JG-10-1083NNRS

WIRE1 WIRE
NTC(03000)

INSSD1
INSS
INSS(00678)

INSSD11
INSS
INSS(00678)

INSSQ5
INSS
INSS(00678)

FRP
FRP(00535)
FRP BOARD

INSU1
INSU
INSU(00679)

INSU2
INSU
INSU(00679)

INSU3
INSU
INSU(00679)

INSU4
INSU
INSU(00679)

INSU5
INSU
INSU(00679)

INSU6
INSU
INSU(00679)

HSD37
HEAT SINK
HS10-4
HS30*10*4(1)

HSD38
HEAT SINK
HS10-4
HS30*10*4(1)

HSD39
HEAT SINK
HS10-4
HS30*10*4(1)

HSD43
HEAT SINK
HS10-4
HS30*10*4(1)

SCREW13
SCREW
SCM3*8(90209)

SCREW14
SCREW
SCM3*8(90209)

SCREW15
SCREW
SCM3*8(90209)

SCREW16
SCREW
SCM3*8(90209)

SCREW17
SCREW
SCM3*8(90209)

SCREW18
SCREW
SCM3*8(90209)

SCREW19
SCREW
SCM3*8(90209)

SCREW20
SCREW
SCM3*8(90209)

SCREW21
SCREW
SCM3*8(90209)

SCREW1
SCREW
SCM3*12(90208)

SCREW2
SCREW
SCM3*12(90208)

SCREW3
SCREW
SCM3*12(90208)

SCREW4
SCREW
SCM3*12(90208)

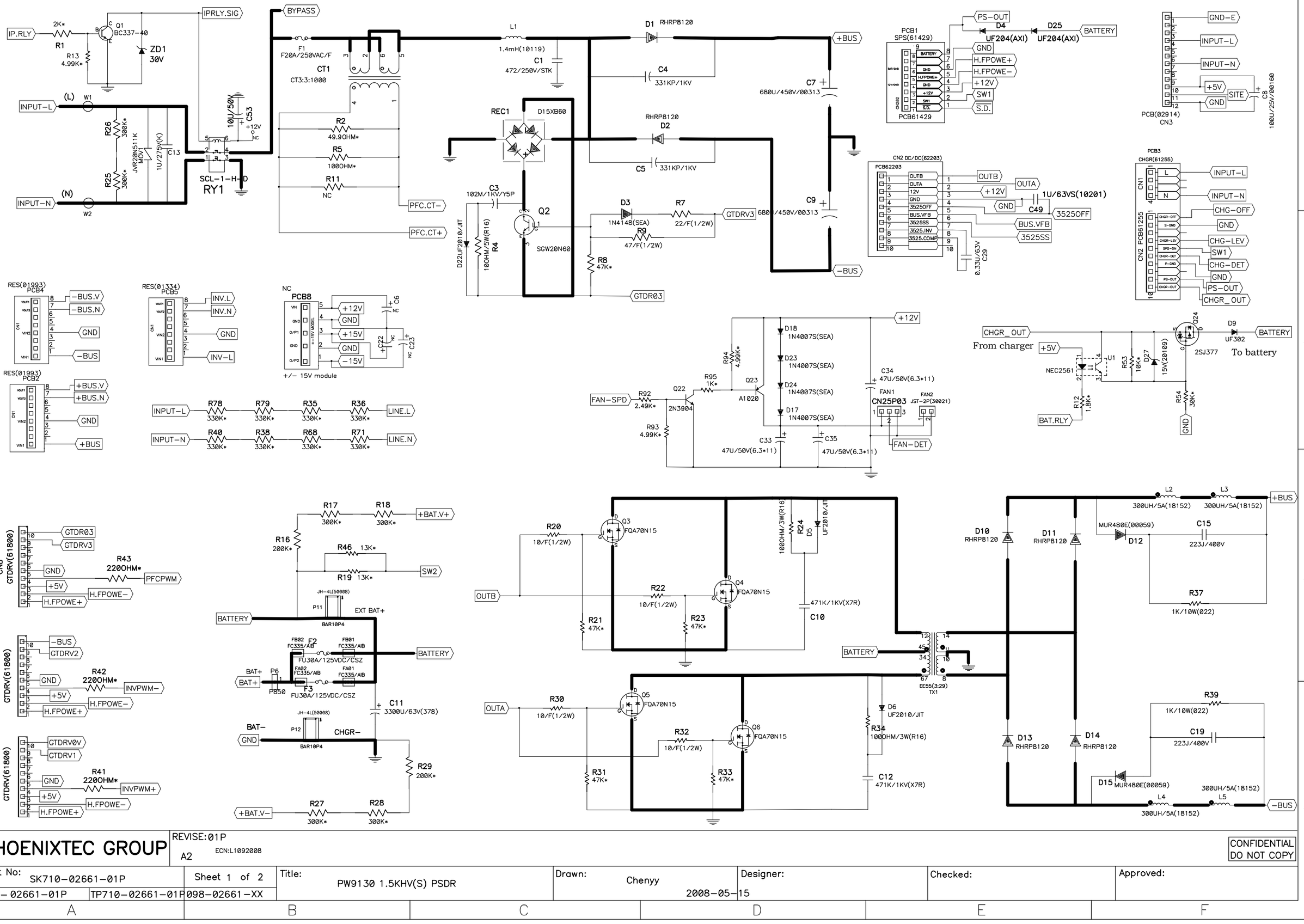
SCREW5
SCREW
SCM3*12(90208)

JP61 JP600(0.6)
JP9 JP600(0.6)
JP40 JP600(0.6)
JP42 JP600(0.6)
JP43 JP600(0.6)
JP44 JP600(0.6)
JP45 JP600(0.6)
JP47 JP600(0.6)
JP51 JP600(0.6)
JP52 JP600(0.6)
JP60 JP600(0.6)
JP54 JP600(0.6)
JP56 JP600(0.6)
JP58 JP600(0.6)
JP62 JP600(0.6)
JP74 JP600(0.6)
JP78 JP600(0.6)
JP85 JP600(0.6)
JP108 JP600(0.6)
JP109 JP600(0.6)
JP123 JP600(0.6)
JP125 JP600(0.6)
JP2 JP600(0.6)
JP82 JP600(0.6)
JP39 JP700(0.6)
JP41 JP700(0.6)
JP63 JP700(0.6)
JP67 JP700(0.6)
JP83 JP700(0.6)
JP96 JP700(0.6)
JP111 JP700(0.6)
JP87 JP700(0.6)
JP15 JP700(0.6)
JP80 JP700(0.6)
JP110 JP700(0.6)
JP59 JP800(0.6)
JP55 JP900(0.6)
JP107 JP900(0.6)
JP14 JP900(0.6)
JP6 JP1000(0.6)
JP53 JP1000(0.6)
JP13 JP1000(0.6)
JP27 JP1100(0.6)
JP35 JP1100(0.6)
JP93 JP1100(0.6)
JP18 JP1200(0.6)
JP86 JP1200(0.6)
JP76 JP1200(0.6)
JP98 JP1200(0.6)
JP57 JP1200(0.6)
JP99 JP1200(0.6)
JP50 JP1300(0.6)
JP103 JP1300(0.6)
JP113 JP1300(0.6)
JP36 JP1400(0.6)
JP26 JP1400(0.6)
JP29 JP1400(0.6)
JP30 JP1400(0.6)
JP104 JP1500(0.6)
JP3 JP1500(0.6)
JP5 JP1500(0.6)
JP31 JP1500(0.6)
JP32 JP1500(0.6)
JP33 JP1500(0.6)
JP34 JP1500(0.6)
JP81 JP1500(0.6)
JP90 JP1500(0.6)
JP1 JP1600(0.6)
JP23 JP1600(0.6)
JP24 JP1600(0.6)
JP25 JP1600(0.6)
JP91 JP1600(0.6)
JP105 JP1600(0.6)
JP97 JP1600(0.6)
JP65 JP1600(0.6)
JP66 JP1600(0.6)
JP94 JP1700(0.6)
JP88 JP1700(0.6)
JP89 JP1700(0.6)
JP8 JP1700(0.6)
JP17 JP1700(0.6)
JP95 JP1700(0.6)
JP10 JP1800(0.6)
JP12 JP1800(0.6)
JP20 JP1800(0.6)
JP28 JP1800(0.6)
JP77 JP1800(0.6)
JP64 JP1800(0.6)
JP106 JP1800(0.6)
JP37 JP1900(0.6)
JP84 JP1900(0.6)
JP100 JP1900(0.6)
JP4 JP2100(0.6)
JP7 JP2100(0.6)
JP46 JP2100(0.6)
JP48 JP2100(0.6)
JP21 JP2200(0.6)
JP22 JP2200(0.6)
JP38 JP2200(0.6)
JP101 JP2200(0.6)
JP68 JP2200(0.6)
JP69 JP2200(0.6)
JP92 JP2300(0.6)
JP71 JP2300(0.6)
JP70 JP2300(0.6)
JP102 JP2400(0.6)
JP16 JP2500(0.6)
JP19 JP2500(0.6)
JP112 JP2500(0.6)
JP117 JP2500(0.6)
JP118 JP2500(0.6)
JP72 JP2500(0.6)
JP73 JP2500(0.6)
JP75 JP2500(0.6)
JP79 JP2500(0.6)
JP119 JP2500(0.6)
JP120 JP2500(0.6)

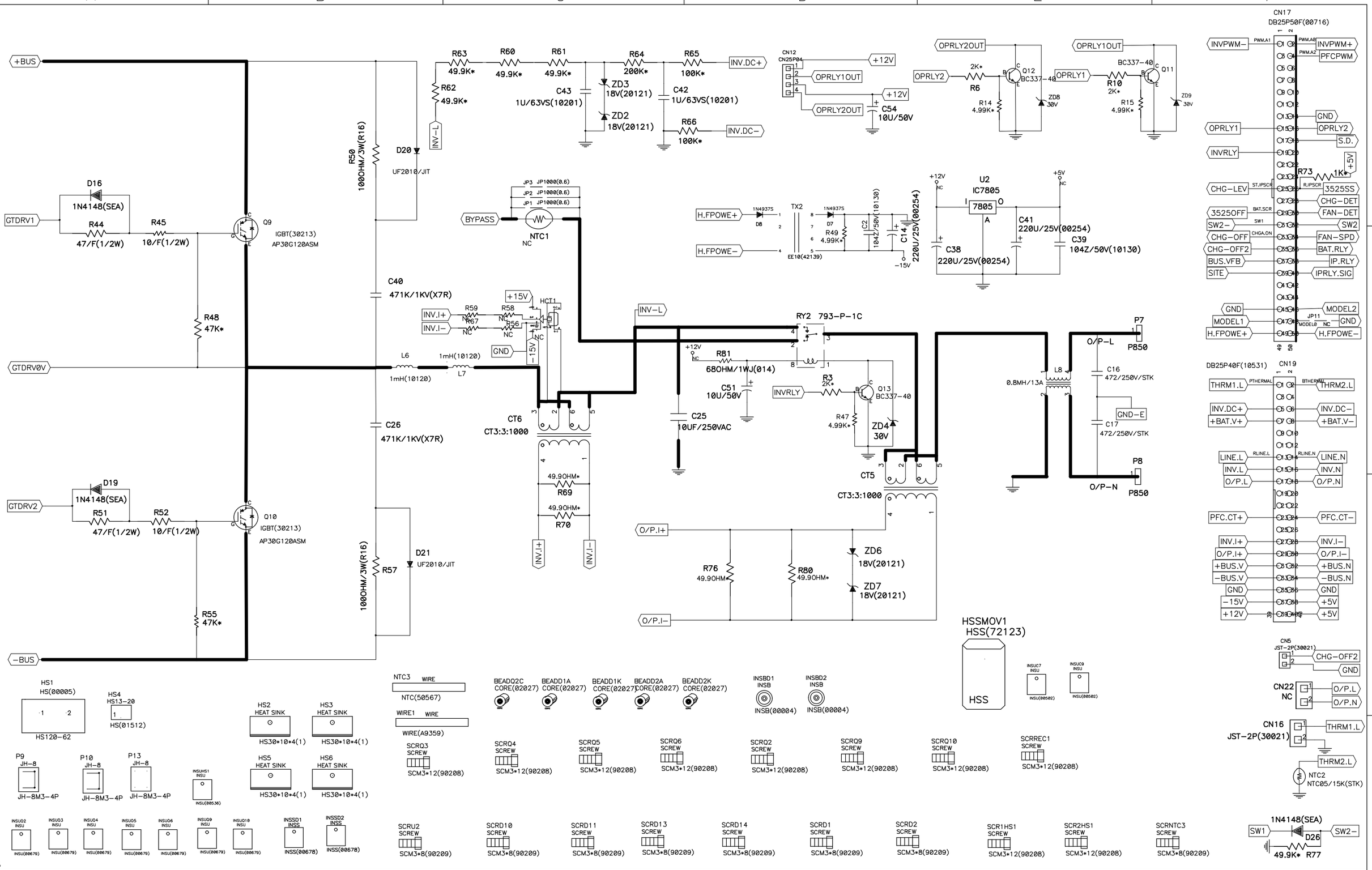
A

PHOENIXTEC GROUP	REVISE:01P ECN:L1092008 A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02662-01P	Sheet 3 of 3	Title: PCB'Y PSDR 1053 POWERWARE GP	Drawn: CHENLIAN 2008.4.25	Designer:	Checked:	Approved:
710-02662-01P	TP710-02662-01P 098-02662-XX					

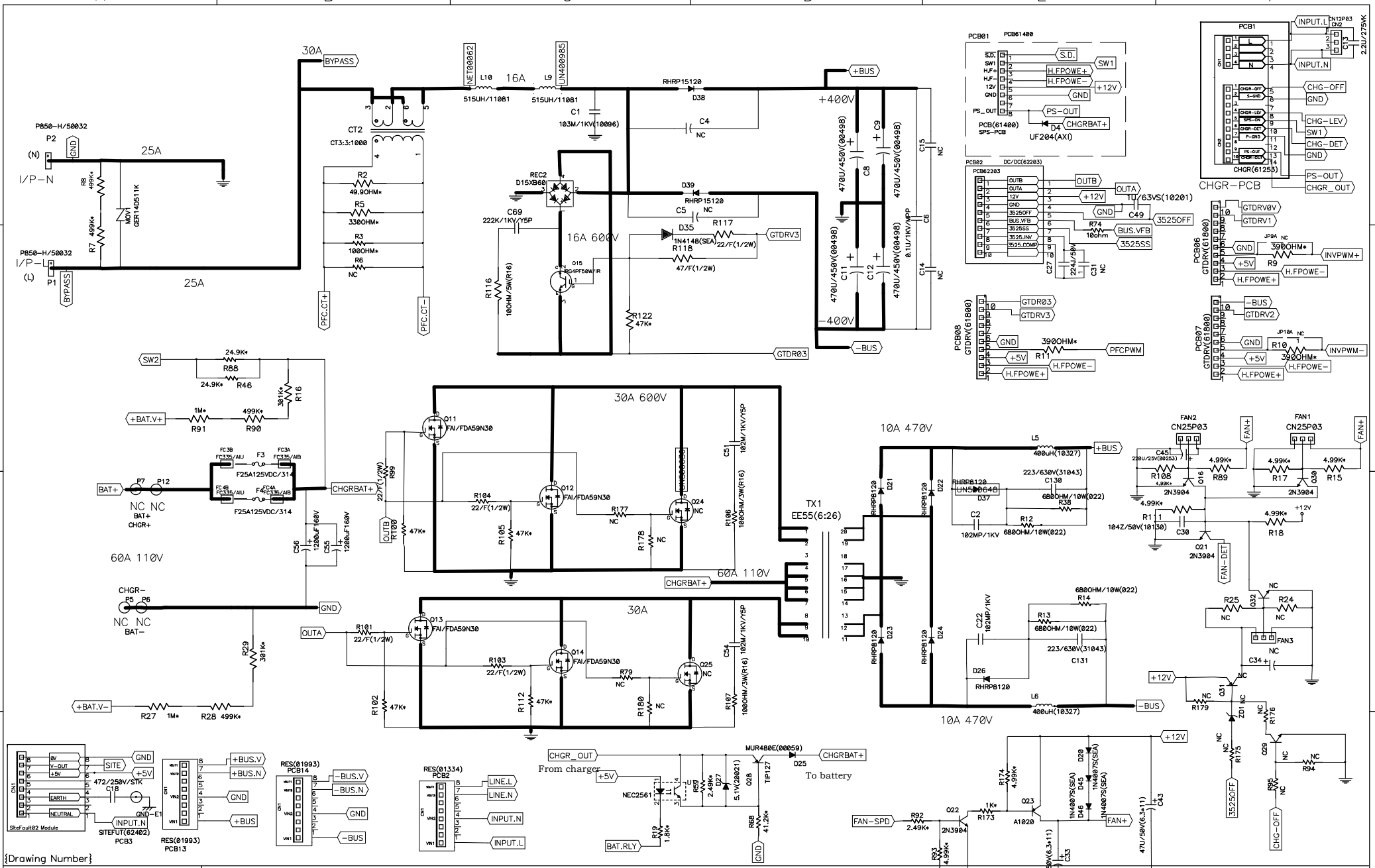
TC-RDW-49-23



PHOENIXTEC GROUP	REVISE:01P A2 ECN:L1092008					CONFIDENTIAL DO NOT COPY
Part No: SK710-02661-01P	Sheet 1 of 2	Title: PW9130 1.5KHV(S) PSDR	Drawn: Chenyy	Designer:	Checked:	Approved:
710-02661-01P	TP710-02661-01P 098-02661-XX		2008-05-15			



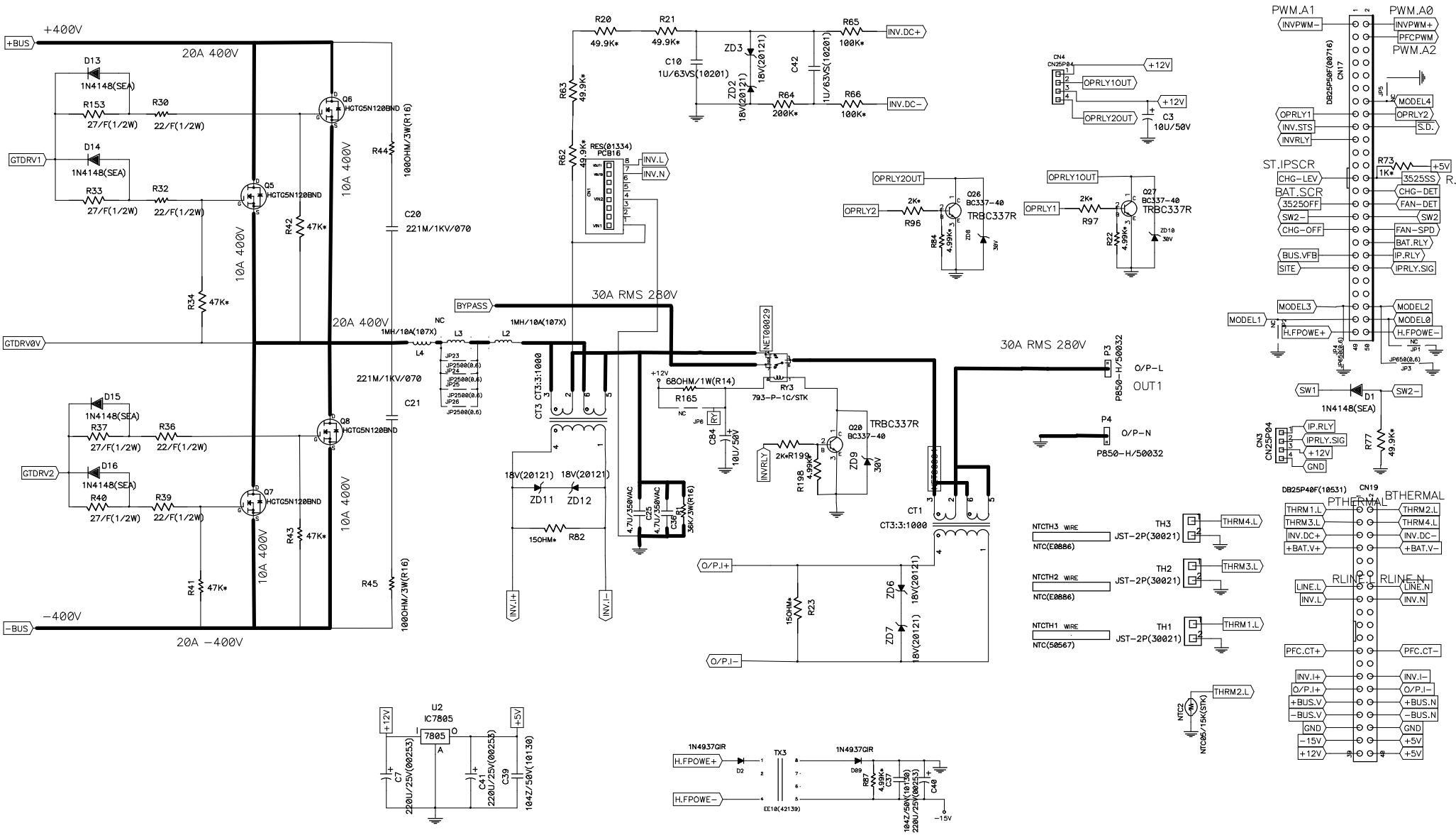
PHOENIXTEC GROUP	REVISE:01P A2 ECN:L1092008				CONFIDENTIAL DO NOT COPY
Part No: SK710-02661-01P	Sheet 2 of 2	Title: PW9130 1.5KHV(S) PSDR	Drawn: Chenyy	Designer:	Checked: / Approved:
710-02661-01P	TP710-02661-01P 098-02661-XX		2008-05-15		



{Drawing Number}

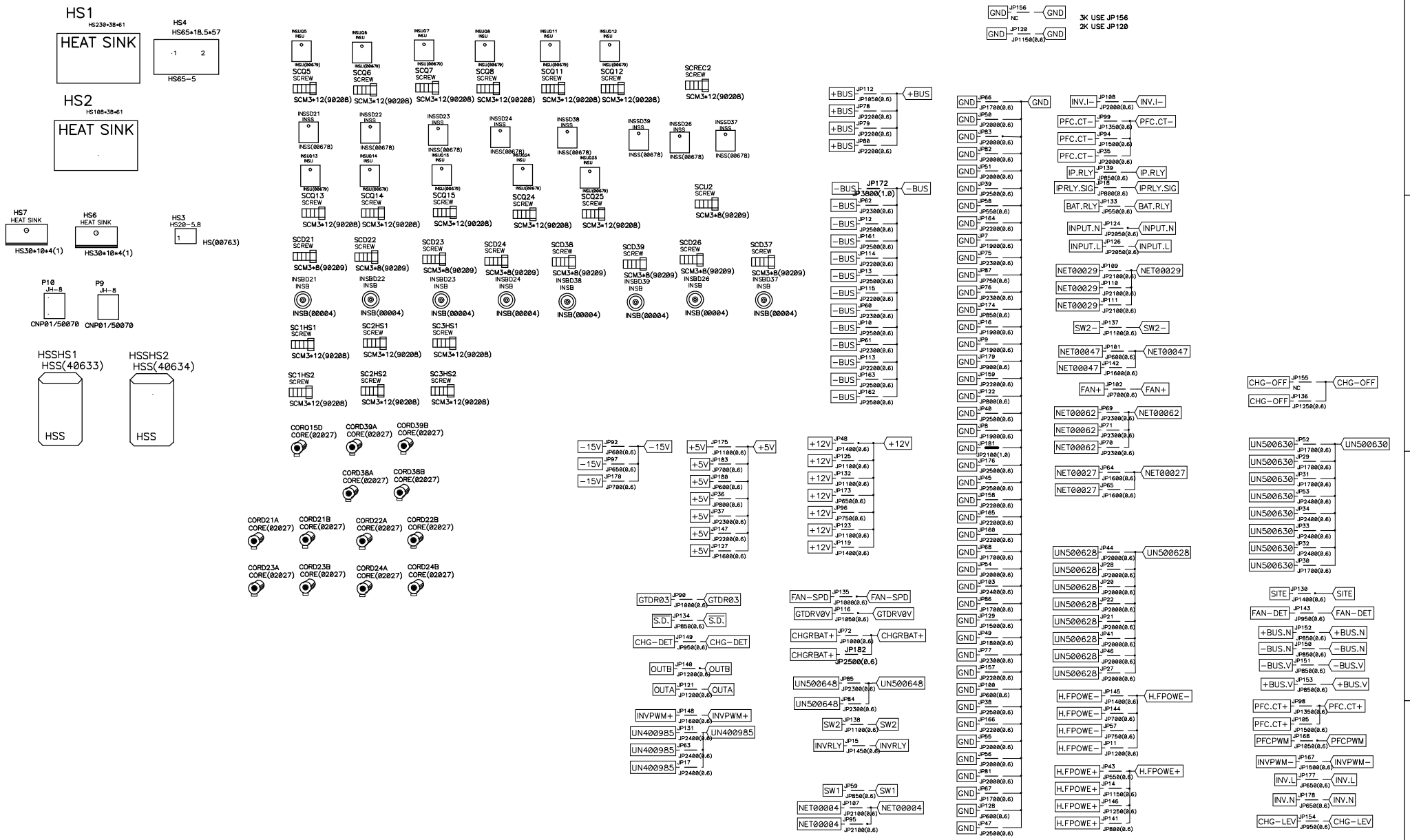
PHOENIXTEC GROUP	REVISE:00P A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02345-00P	Sheet 1 of 3	Title: 912X TOWER 2K HV PSDR	Drawn: {Drawn By} {Date}	Designer:	Checked:	Approved:
710-02345-00	TP710-02345-00P 098-02345-XX					

TC-RDW-49-23



{Drawing Number}

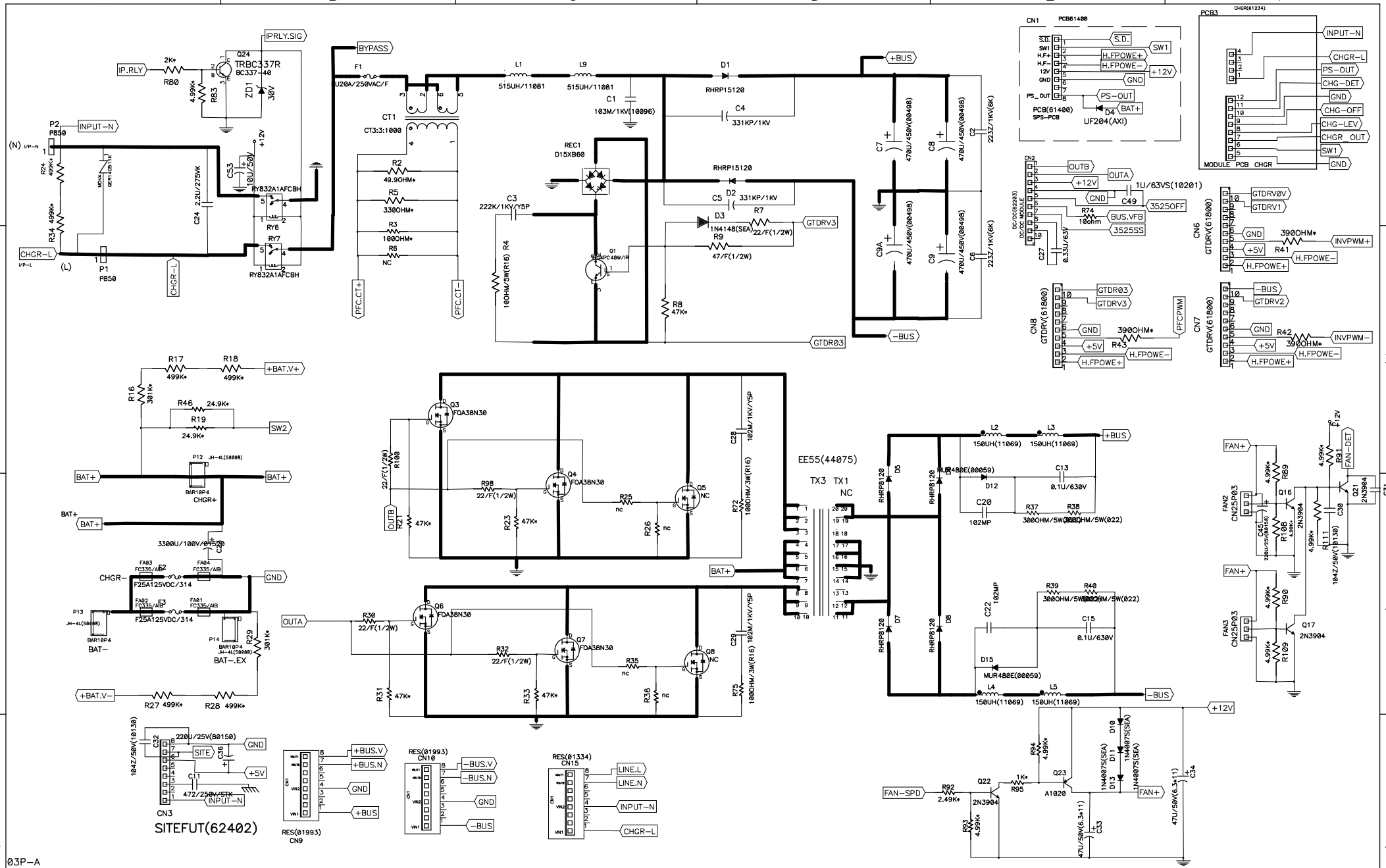
PHOENIXTEC GROUP	REVISE:00P A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02345-00P	Sheet 2 of 3	Title: 912X TOWER 2K HV PSDR	Drawn: {Drawn By} {Date}	Designer:	Checked:	Approved:
710-02345-00	TP710-02345-00P 098-02345-XX					



{Drawing Number}

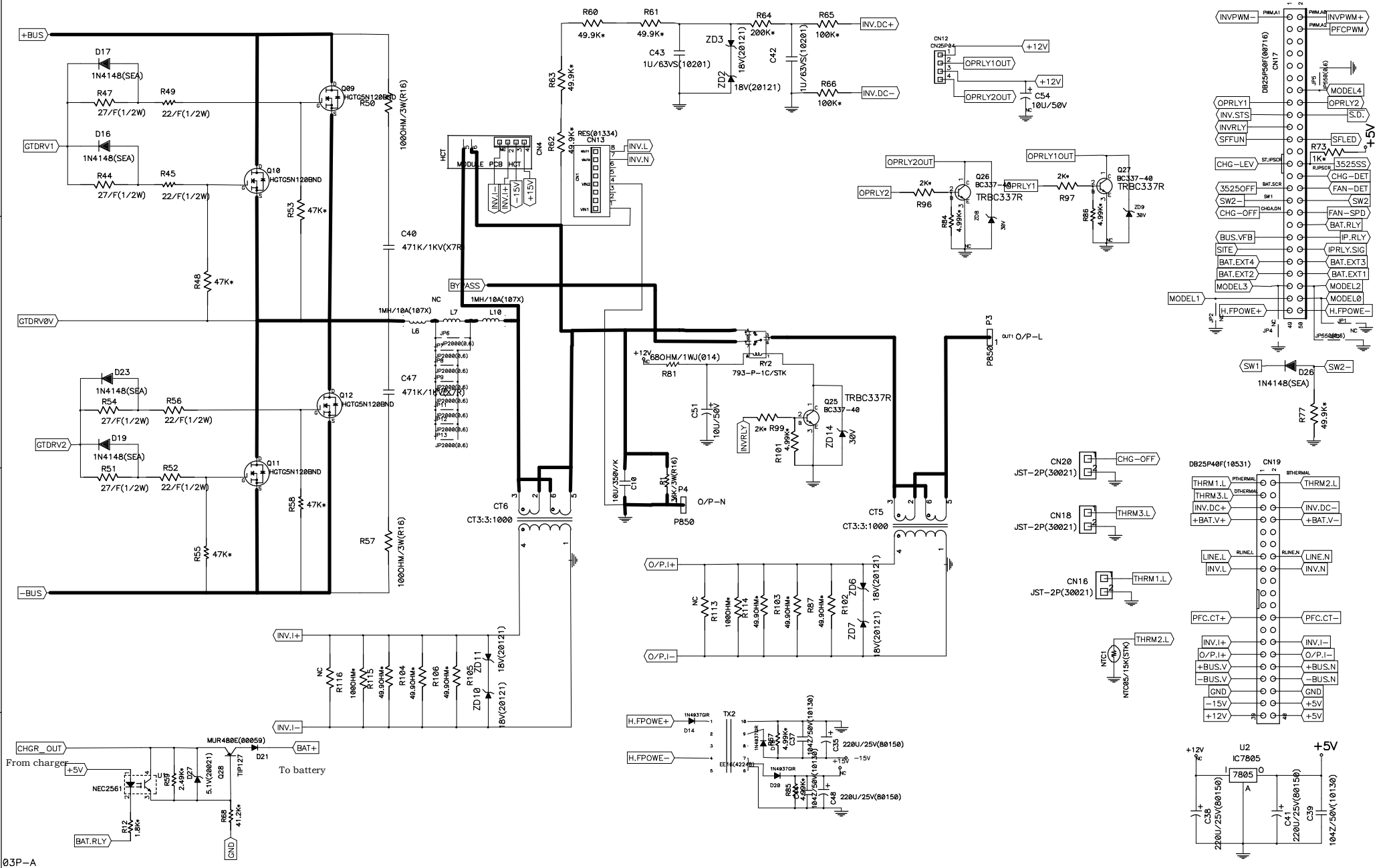
PHOENIXTEC GROUP	REVISE:00P A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02345-00P	Sheet 3 of 3	Title: 912X TOWER 2K HV PSDR	Drawn: {Drawn By} {Date}	Designer:	Checked:	Approved:
710-02345-00	TP710-02345-00P	098-02345-XX				

TC-RDW-49-23



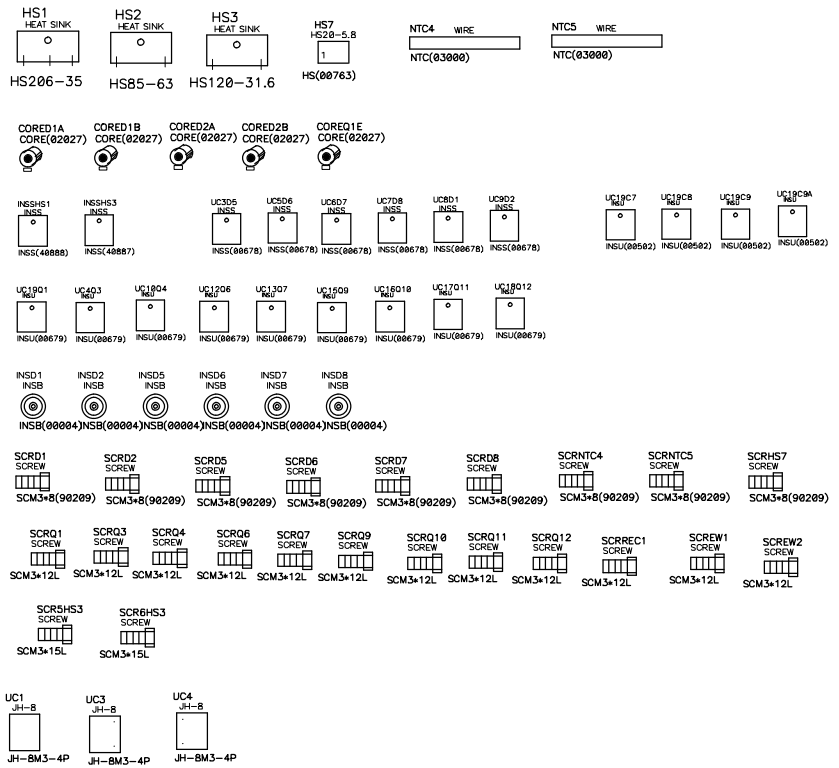
03P-A

PHOENIXTEC GROUP	REVISE:03P A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02340-03P	Sheet 1 of 3	Title: RACK 2K HV PSDR	Drawn: ZOULL	Designer:	Checked:	Approved:
710-02340-03P / TP710-02340-03P	098-02340-XX		2007/12/21			



03P-A

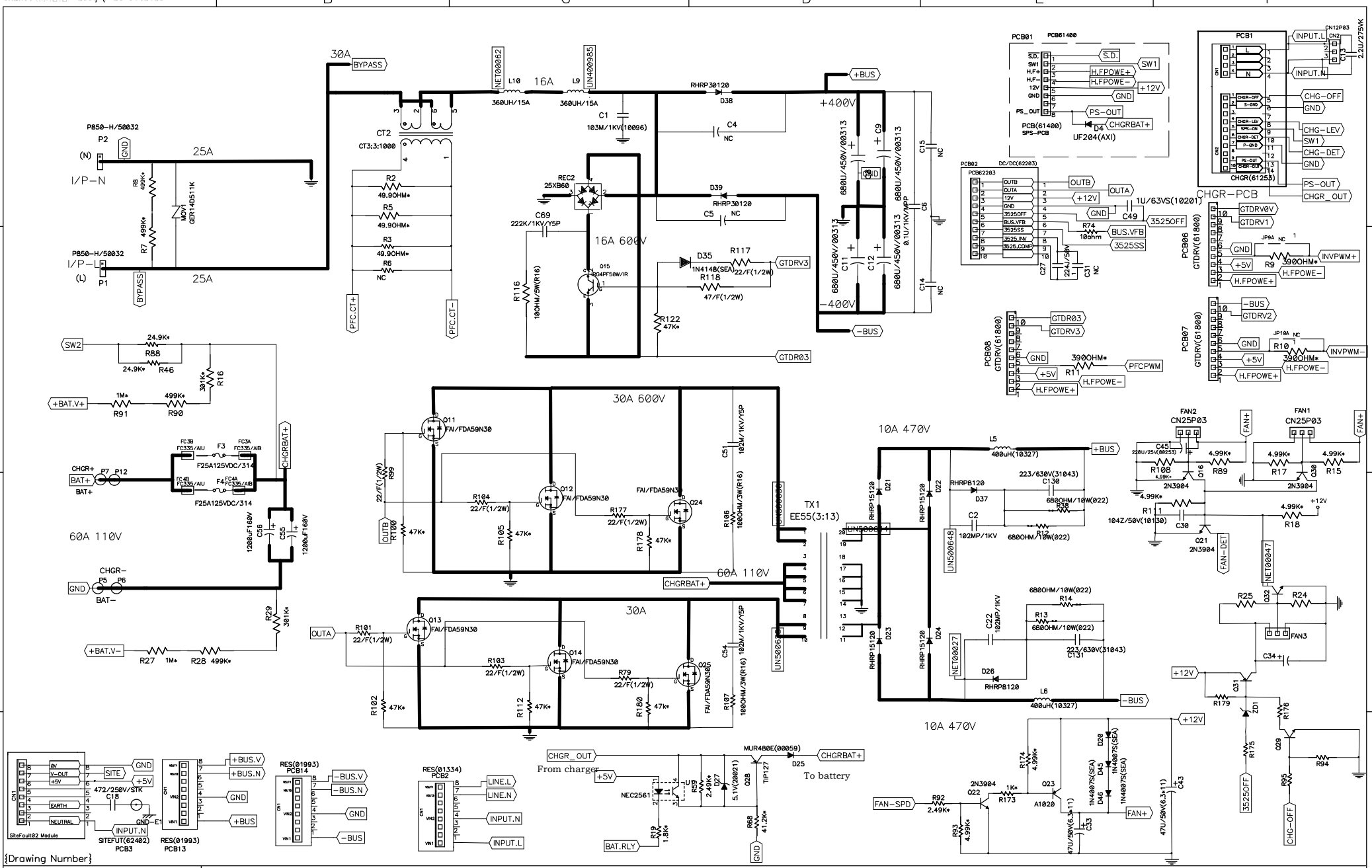
PHOENIXTEC GROUP	REVISE:03P A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02340-03P	Sheet 2 of 3	Title: RACK 2K HV PSDR	Drawn: ZOULL	Designer:	Checked:	Approved:
710-02340-03P / TP710-02340-03P	098-02340-XX		2007/12/21			



03P-A

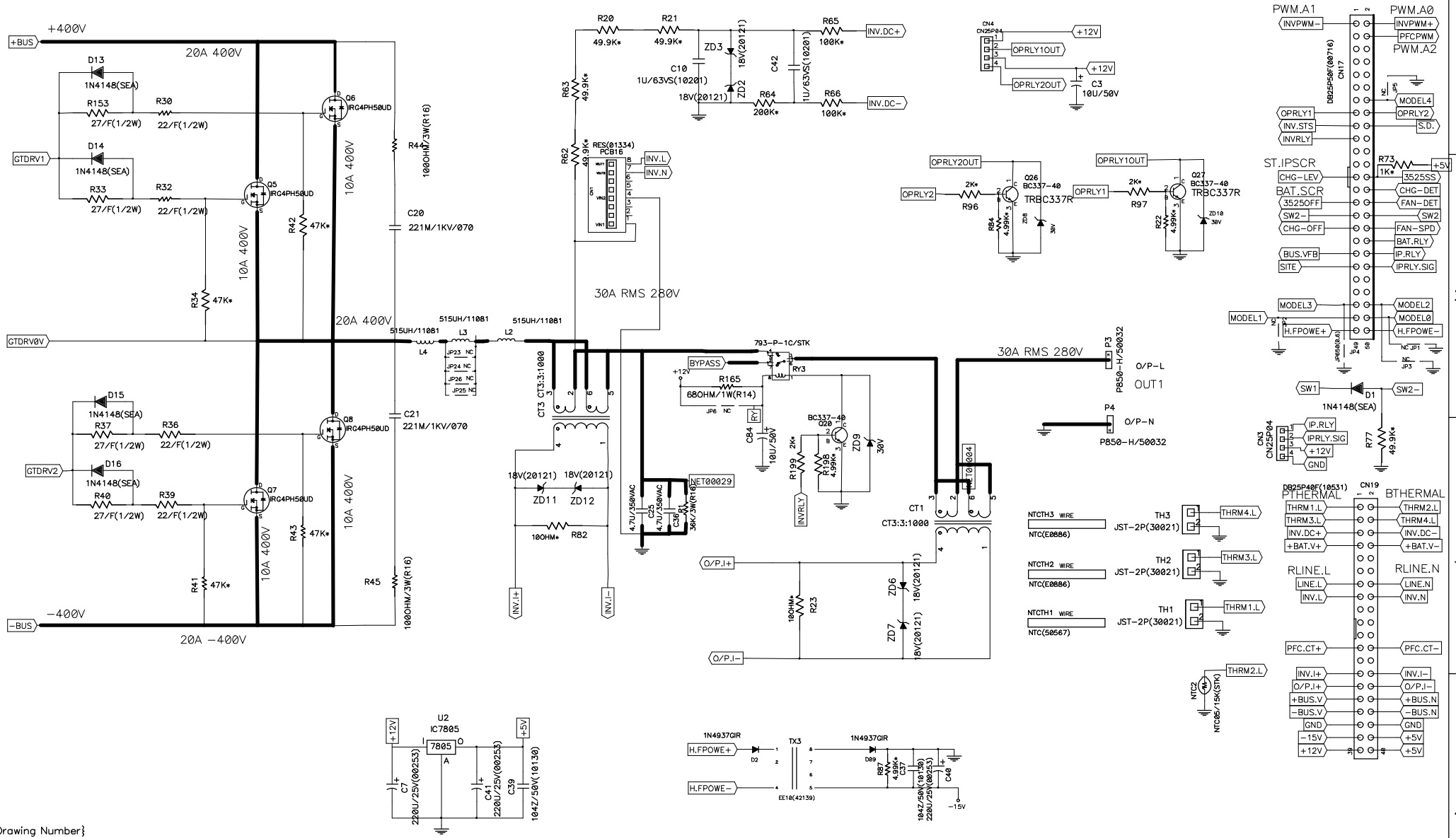
PHOENIXTEC GROUP	REVISE:03P A2 ECN: L1402008					CONFIDENTIAL DO NOT COPY
Part No: SK710-02340-03P	Sheet 3 of 3	Title: RACK 2K HV PSDR	Drawn: ZOULL	Designer:	Checked:	Approved:
710-02340-03P / TP710-02340-03P	098-02340-XX		2007/12/21			

PDM CHENYY(陈艳艳) 2008-3-23 9:12:26



{Drawing Number}

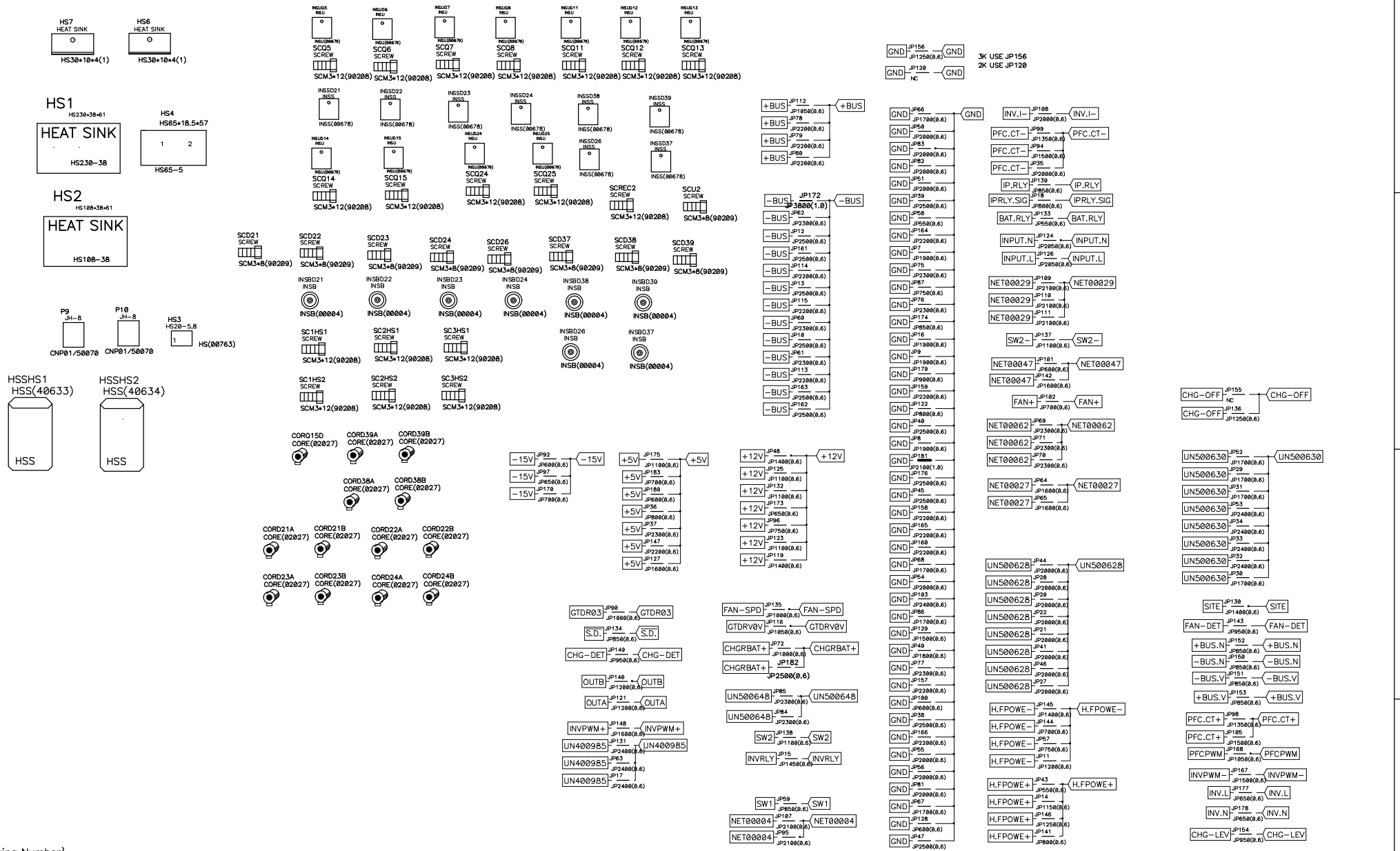
PHOENIXTEC GROUP	REVISE:00P A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02346-00P	Sheet 1 of 3	Title: 912X(TOWER) 3K HV PSDR	Drawn: {Drawn By} {Date}	Designer:	Checked:	Approved:
710-02346-00P	TP710-02346-00P 098-02345-XX					



{Drawing Number}

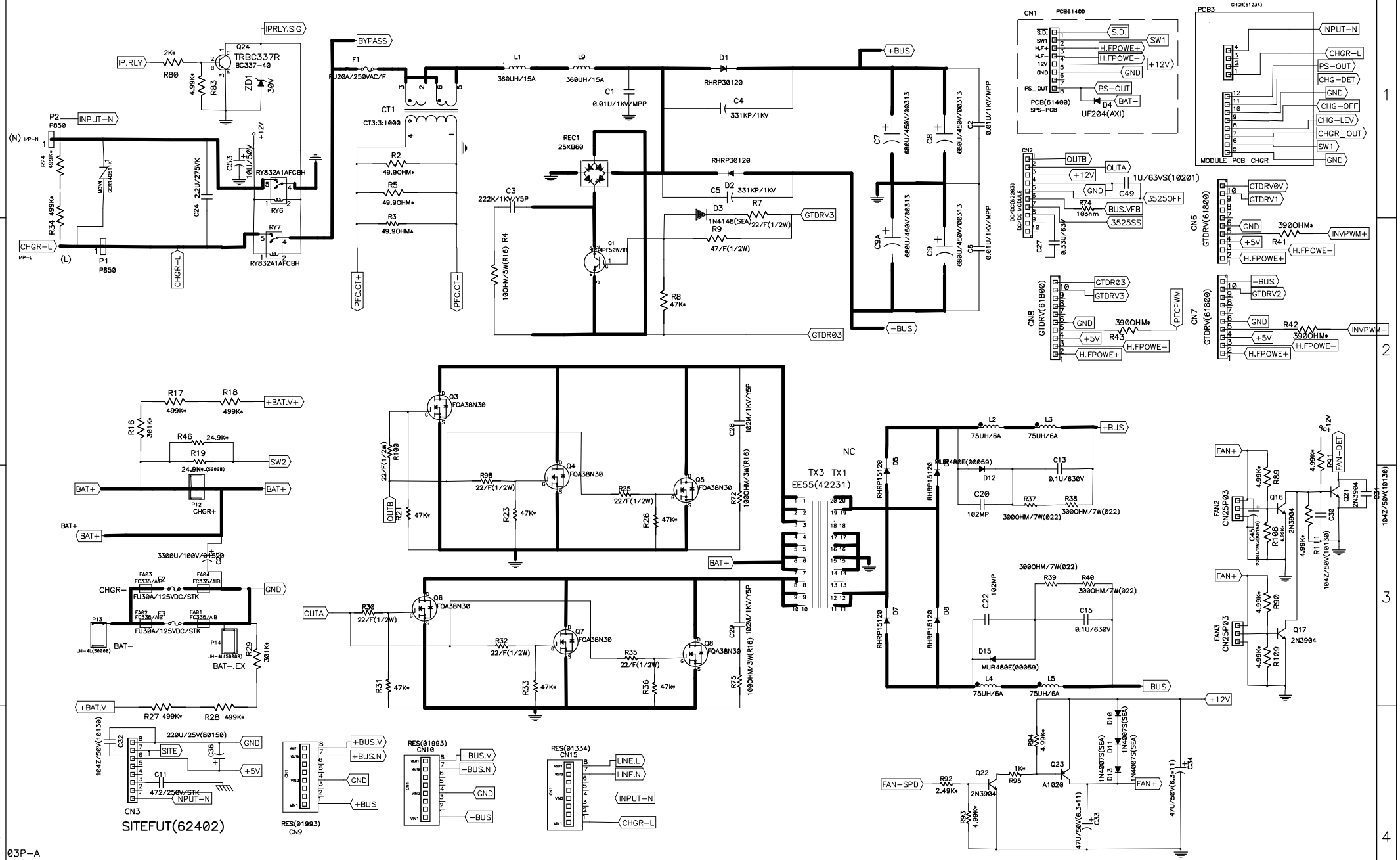
PHOENIXTEC GROUP	REVISE:00P A2				CONFIDENTIAL DO NOT COPY
Part No: SK710-02346-00P	Sheet 2 of 3	Title: 912X(TOWER) 3K HV PSDR	Drawn: {Drawn By} {Date}	Designer:	Checked:	Approved:
710-02346-00P	TP710-02346-00P 098-02345-XX					

TC-RDW-49-23



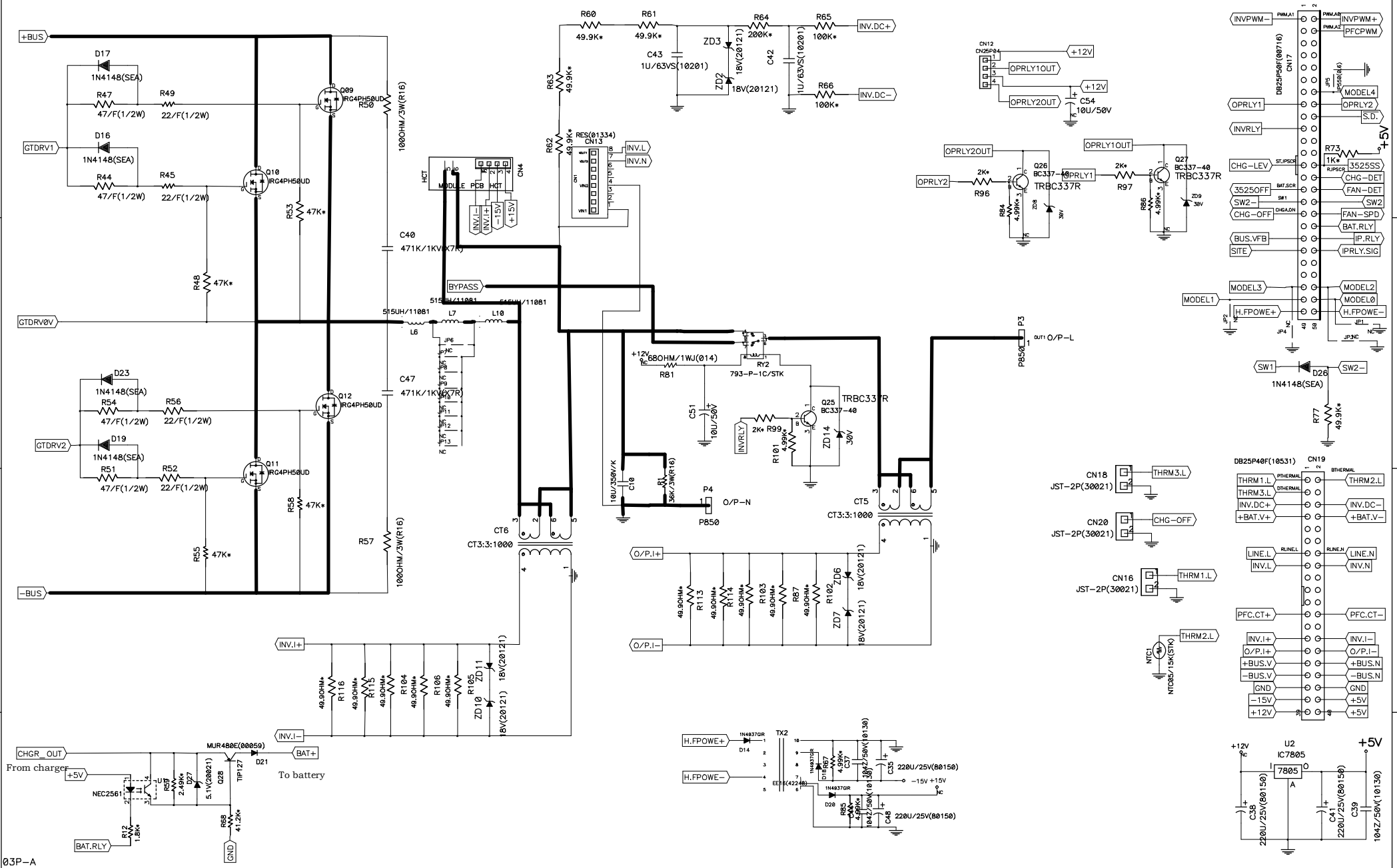
{Drawing Number}

PHOENIXTEC GROUP	REVISE:00P A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02346-00P	Sheet 3 of 3	Title: 912X(TOWER) 3K HV PSDR	Drawn: {Drawn By} {Date}	Designer:	Checked:	Approved:
710-02346-00P	TP710-02346-00P 098-02345-XX					



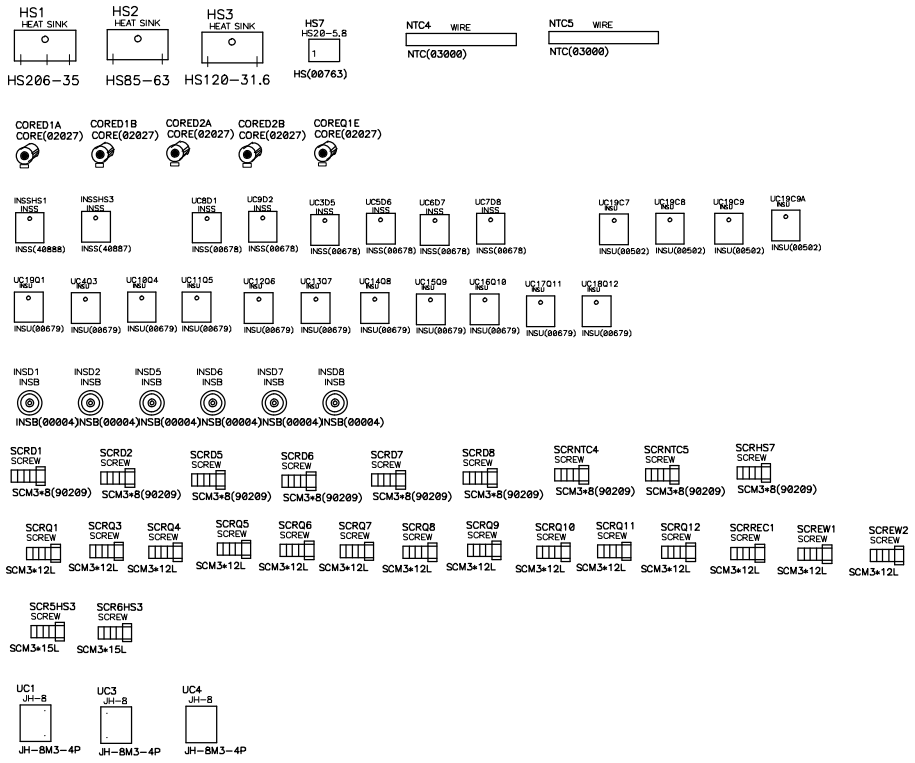
03P-A

PHOENIXTEC GROUP	REVISE:03P A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02341-03P	Sheet 1 of 3	Title: RACK 3K HV PSDR	Drawn: ZOULL	Designer:	Checked:	Approved:
710-02341-03P	TP710-02341-03P 098-02340-XX		2007/12/21			



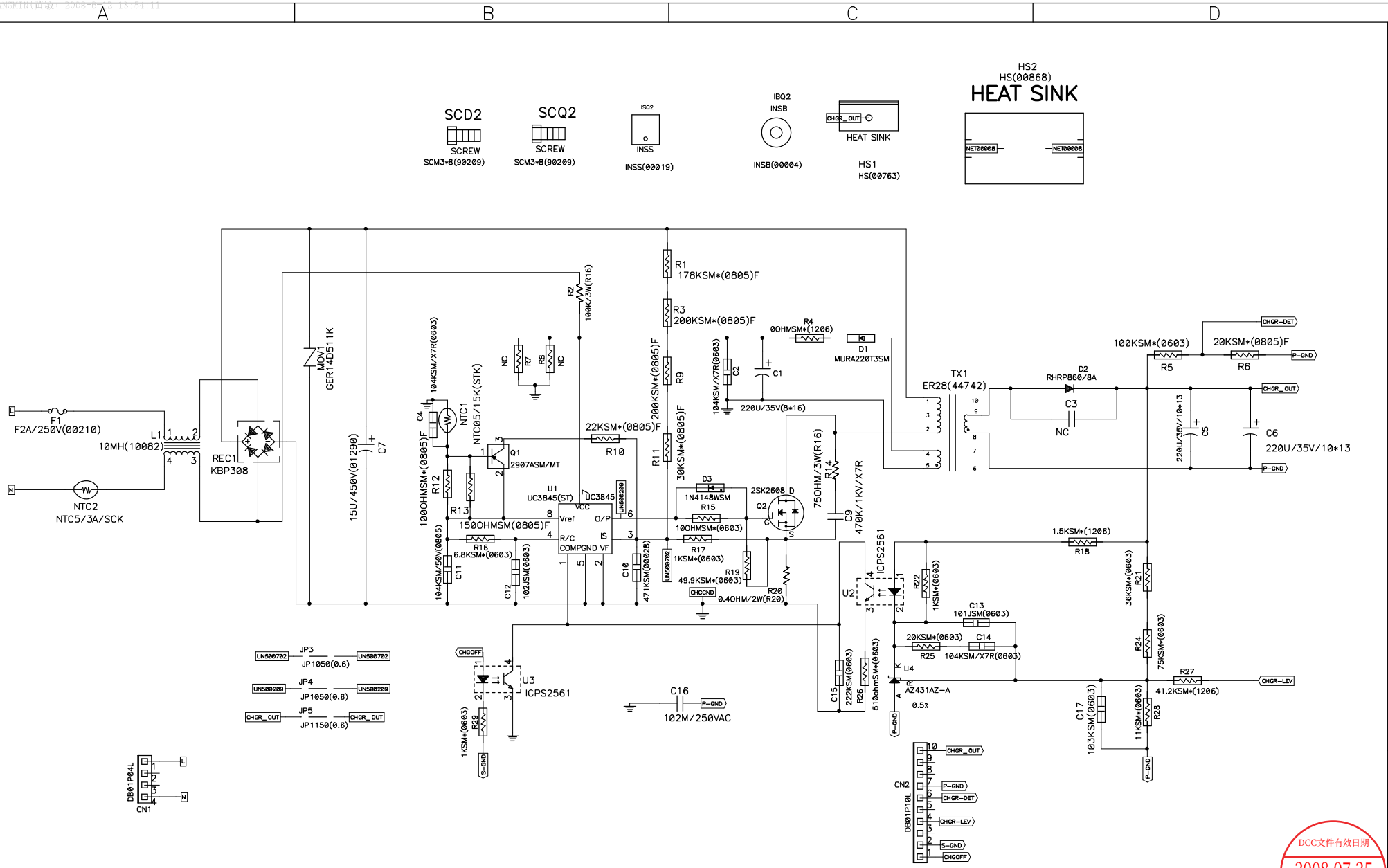
03P-A

PHOENIXTEC GROUP	REVISE:03P A2					CONFIDENTIAL DO NOT COPY
Part No: SK710-02341-03P	Sheet 2 of 3	Title: RACK 3K HV PSDR	Drawn: ZOULL	Designer:	Checked:	Approved:
710-02341-03P TP710-02341-03P 098-02340-XX			2007/12/21			



03P-A

PHOENIXTEC GROUP	REVISE: 03P A2 ECN: L140208					CONFIDENTIAL DO NOT COPY
Part No: SK710-02341-03P	Sheet 3 of 3	Title: RACK 3K HV PSDR	Drawn: ZOULL	Designer:	Checked:	Approved:
710-02341-03P TP710-02341-03P	098-02340-XX		2007/12/21			



(C)

PHOENIXTEC GROUP

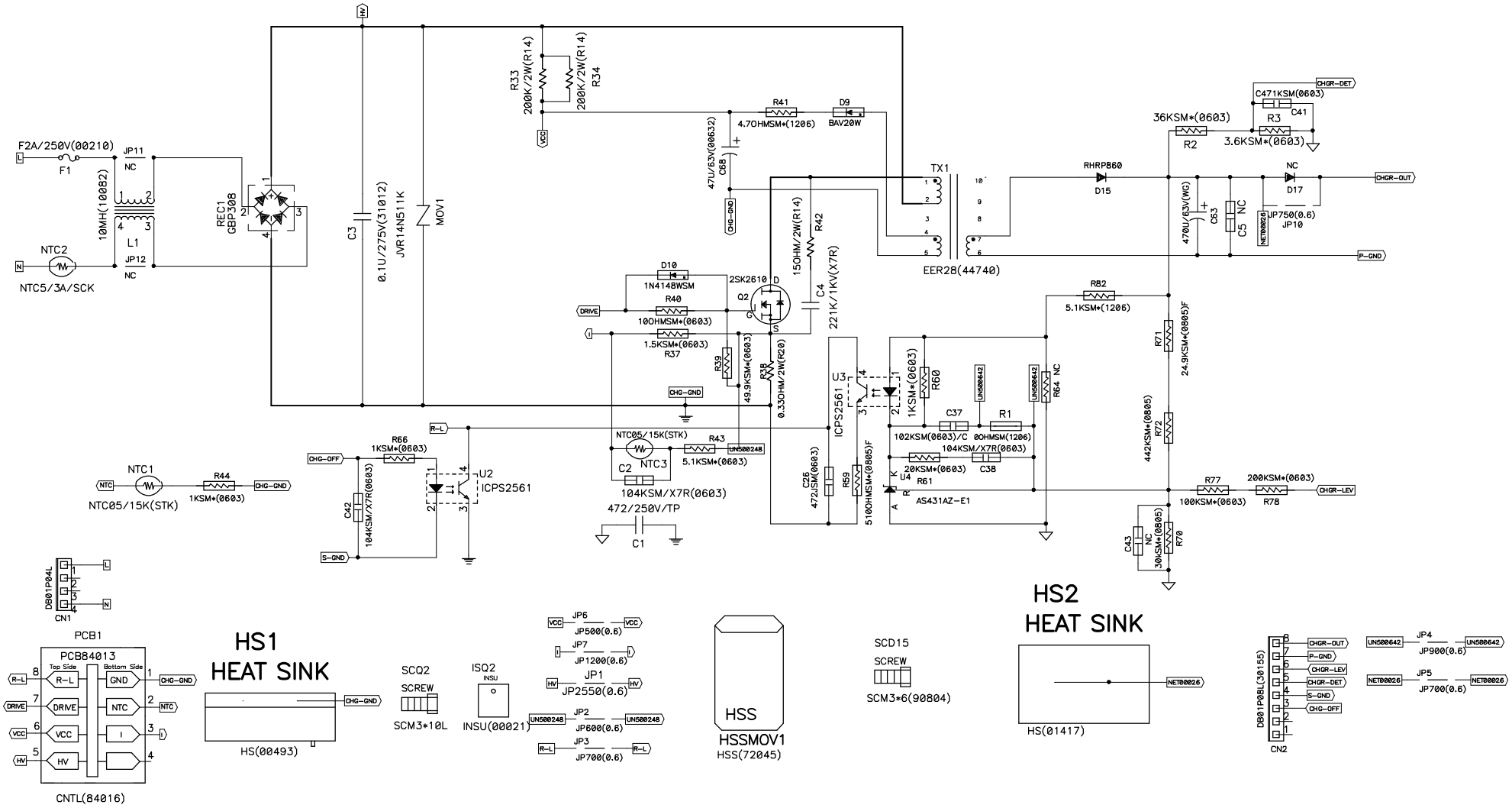
REVISE: 01P ECN NO:BA6292008

1 Repair: 098-61268-00-->01;SK710-61269-00P-->01P;
TP710-61269-00P-->01P;NTC2 032-00080-02->032-00019-00;
R14 016-42060-00->016-00254-00;D1 086-14051-00->086-14036-01;
R12 019-00047-00->019-00100-00;R3 019-03270-00->019-03200-00;
R11 019-03178-00->019-02300-00;R10 019-01430-00->019-02220-00;
Repair: R1 019-02300-00->019-03178-00;SK710-61269-00P-->01P;
C9 070-10252-00->070-00032-00; Q2 088-21871-00->088-21865-00;
HS2 318-01431-00->318-00868-00;
2 Del: C18 040-00632-00; C8 040-70011-00;
JP1 JP2 106-90042-00;
3 ADD: L1 082-10082-01;C1 040-00259-00;
MOV1 094-10163-00.C7 040-01290-00;

A3

Part No: SK710-61269-01P	Sheet 1 of 1	Title: PCB'M CHGR69 100-300VAC 24VDC 50W	Drawn: HuangMin 2008-06-12	Designer: Louhanfen 2008-06-12	Checked:Wangqingqing 2008-06-12	Approved: Lilunquan 2008-06-12
710-61269-01P	TP710-61269-01P	098-61268-01				

DCC文件有效日期
2008.07.25
参考文件
CONFIDENTIAL
DO NOT COPY



(B)

ECN NO:BA0812008: Charge:1 098-61266-00-->098-61266-01 2 SK710-61266-00P-->SK710-61266-01P 3 TP710-61266-00P-->TP710-61266-01P
4 HS1 318-00493-00-->318-00493-01 5 R42 016-47024(240HM/3W(R16))-00-->014-37015-00(150HM/2W(R14))

ECN NO:BA4302008: Charge:1 098-61266-01-->098-61266-02 2 SK710-61266-01P-->SK710-61266-02P 3 TP710-61266-01P-->TP710-61266-02P
4 HS1 318-00493-01-->318-00493-02 5 JP JP1 106-90085(JP3800(1.0))-00--106-90138(JP2550(0.6))-00 6 JP7 106-90103(JP700(0.6))
-00--106-90041(JP1200(0.6))-00 7 R41 019-10010(10OHMSM*(1206))-00--019-18470(4.7OHMSM*(1206))-00

ADD: 1 MOV1 094-10099(JVR14N511K)-00 2 HSSMOV1 122-72045(HSS(72045))-00 3 C42 071-00087(104KSM/X7R(0603))-00 4 R1 011-22000(0OHMSM(1206))-00

PHOENIXTEC GROUP

REVISE: 02P

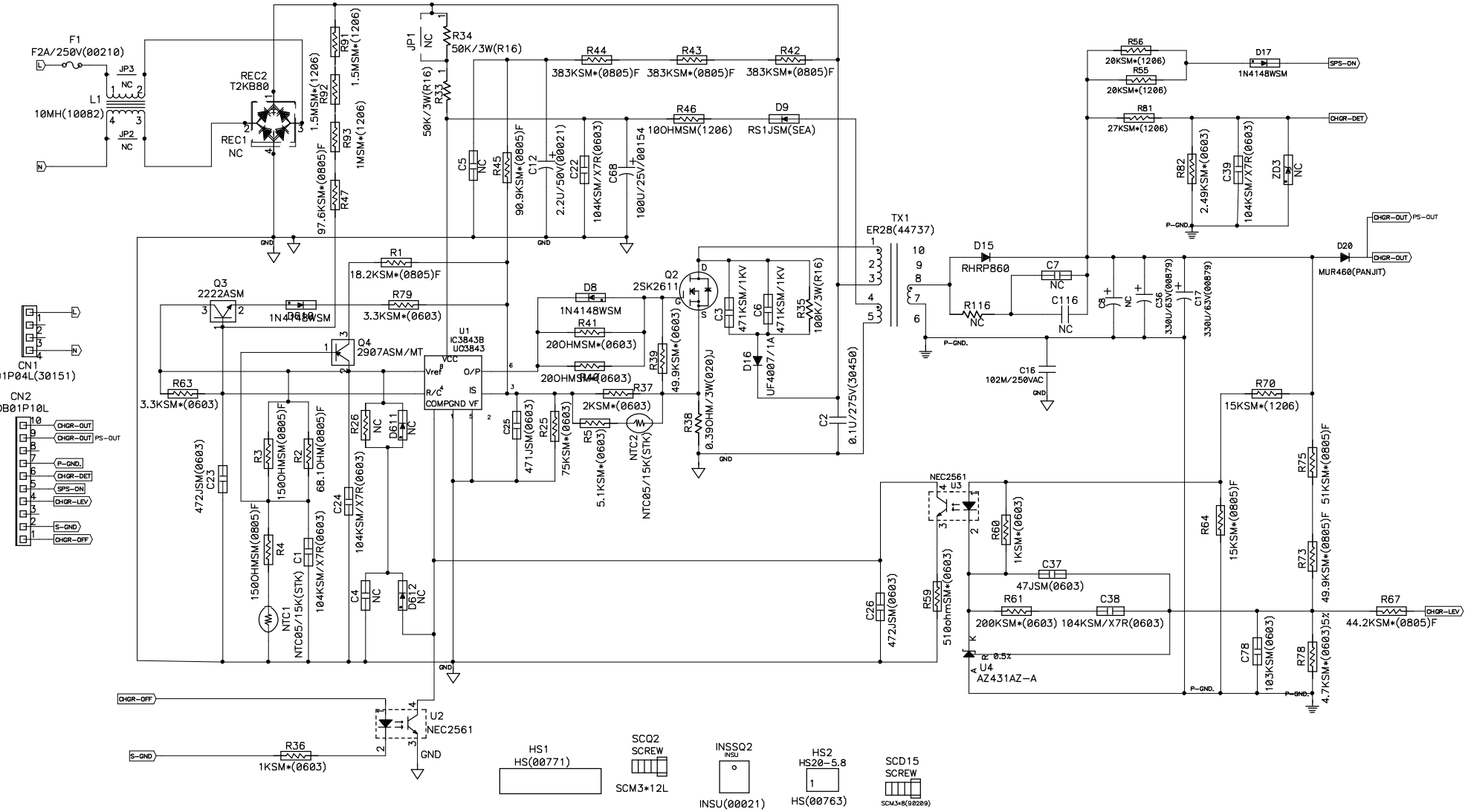
A3

CONFIDENTIAL
DO NOT COPY

Part No: SK710-61266-02P	Sheet 1 of 1	Title: PCB'M CHGR66 100-300VAC 36VDC 60W SANTAK	Drawn:	Designer:	Checked:	Approved:
710-61266-02P	TP710-61266-02P	098-61266 -XX				

2008.07.25
参考文件

TC-RDW-49-23

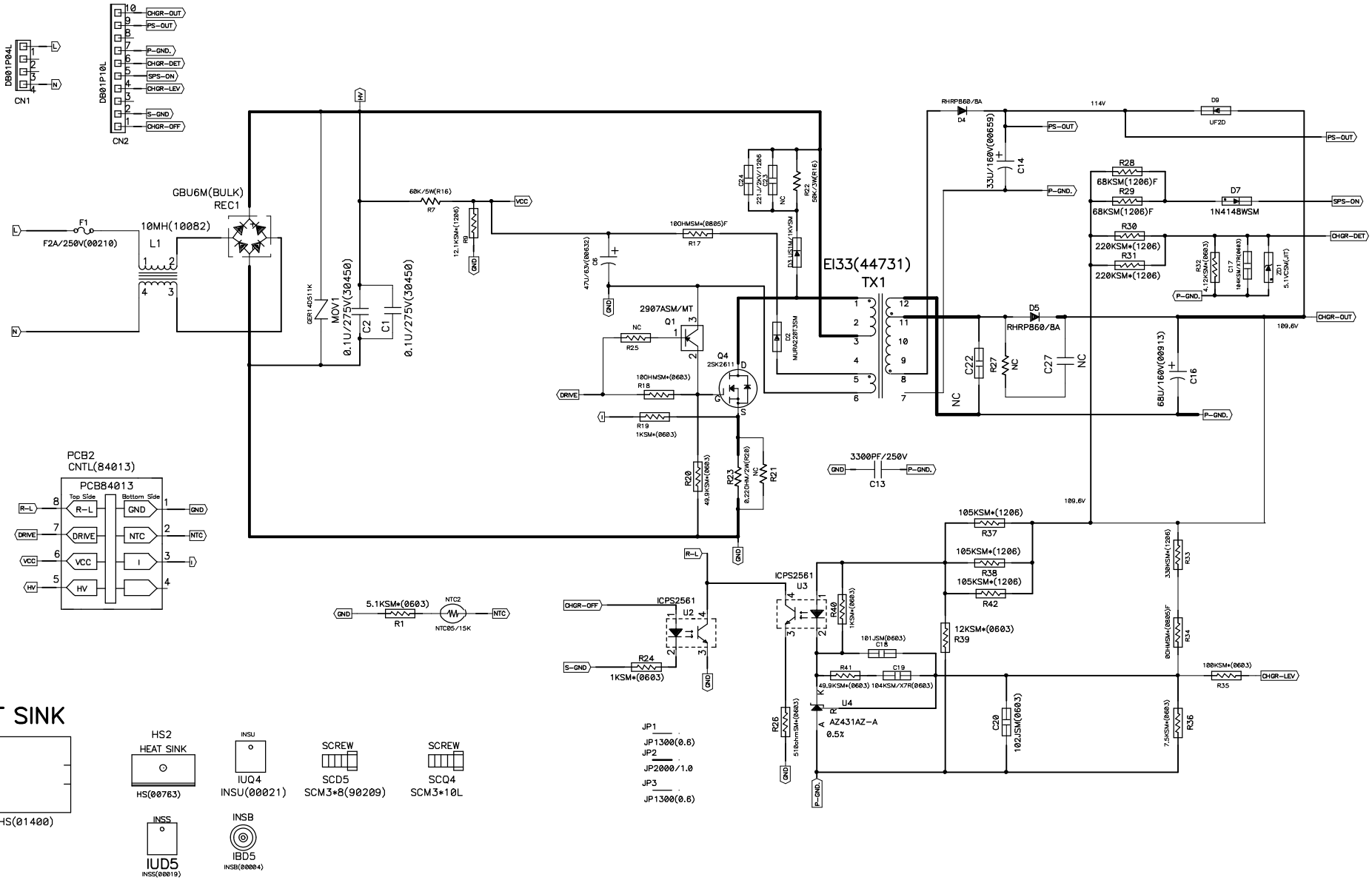


E

PHOENIXTEC GROUP	REVISE: 00P A3				CONFIDENTIAL DO NOT COPY
Part No: SK710-61255-00P	Sheet 1 of 1	Title: PCB'M CHGR55 80Vac-300Vac 54Vdc 75W M	Drawn:	Designer:	Checked: Approved:
710-61255-00P	TP710-61255-00P	098-61255 -XX			

DCC文件有效日期
2008.07.25
参考文件

TC-RDW-49-23



(A)

PHOENIXTEC GROUP

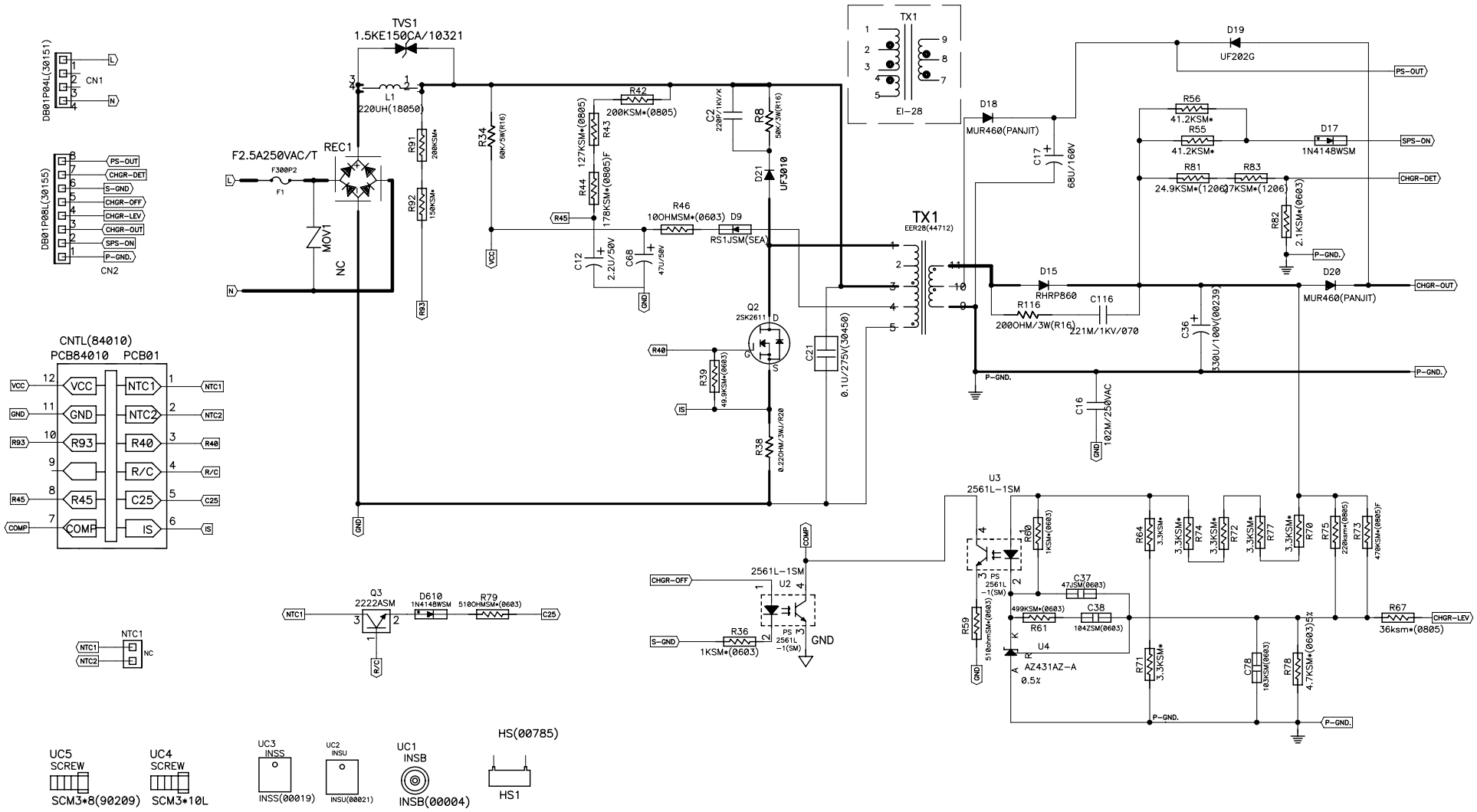
REVISE: 01P ECN:

ADD:1.R23 020-00221-01(0.22OHM/2W(R20)) 2.IBD5 114-00004-01(INSB(00004)) 3.IUD5 114-00019-00(INSS(00019)) 4.MOV1 094-10163-00(GER14D511K)
DELE: 1.R21 020-00221-01(0.22OHM/2W(R20))
CHANGE:1.C13 070-11058-00(3.3NF/250V/M)-->070-05049-00(3300PF/250V)
2.D2 086-14051-00(RS1JSM(SEA))-->086-14036-01(MURA220T3SM)
3.710/A710/SK710/TP710/098-61253-00P-->01P

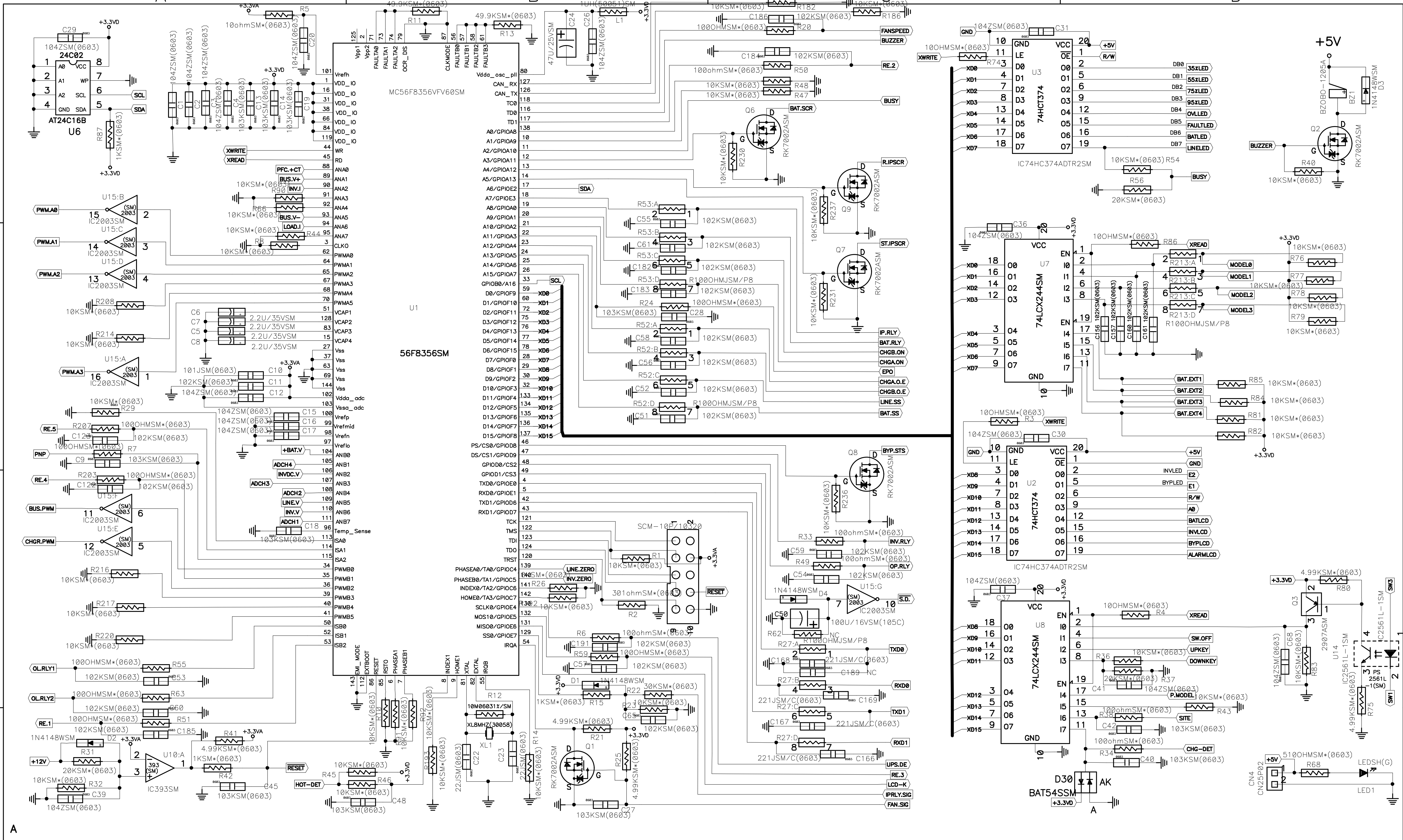
A3

CONFIDENTIAL
DO NOT COPY

Part No: SK710-61253-01P	Sheet 1 of 1	Title: PCB'M CHGR53 100Vac` 300Vac 96Vdc 130W M	Drawn:	Designer: {Engineer}	Checked:{Checked By}	Approved: {Approved By}
710-61253-01P	TP710-61253-01P	098-61253-01				



SANTAK	REVISE: A3	ECN:BA1052007:00P-->01P: R116由016-00257-00变更为016-00251-00 C116由070-10250-00变更为070-10036-00 R81由019-12300-00变更为019-12249-00 R83由019-12300-00变更为019-12270-00 R82由019-51470-00变更为019-51210-00 R73由019-03442-00变更为019-03470-00	ECN:BA1942007:01P-->02P: 增加F1 102-01992-00,增加MOV1，NC掉			CONFIDENTIAL DO NOT COPY
Part No: SK710-61234-02P	Sheet 1 of 1	Title: PCB MODULE-125W CHGR	Drawn: 李星 2007-04-05	Designer:	Checked:	Approved:
710-61234-XX	TP710-61234-02P	098-61234-XX				



PHOENIXTEC GROUP

REVISE: 02P

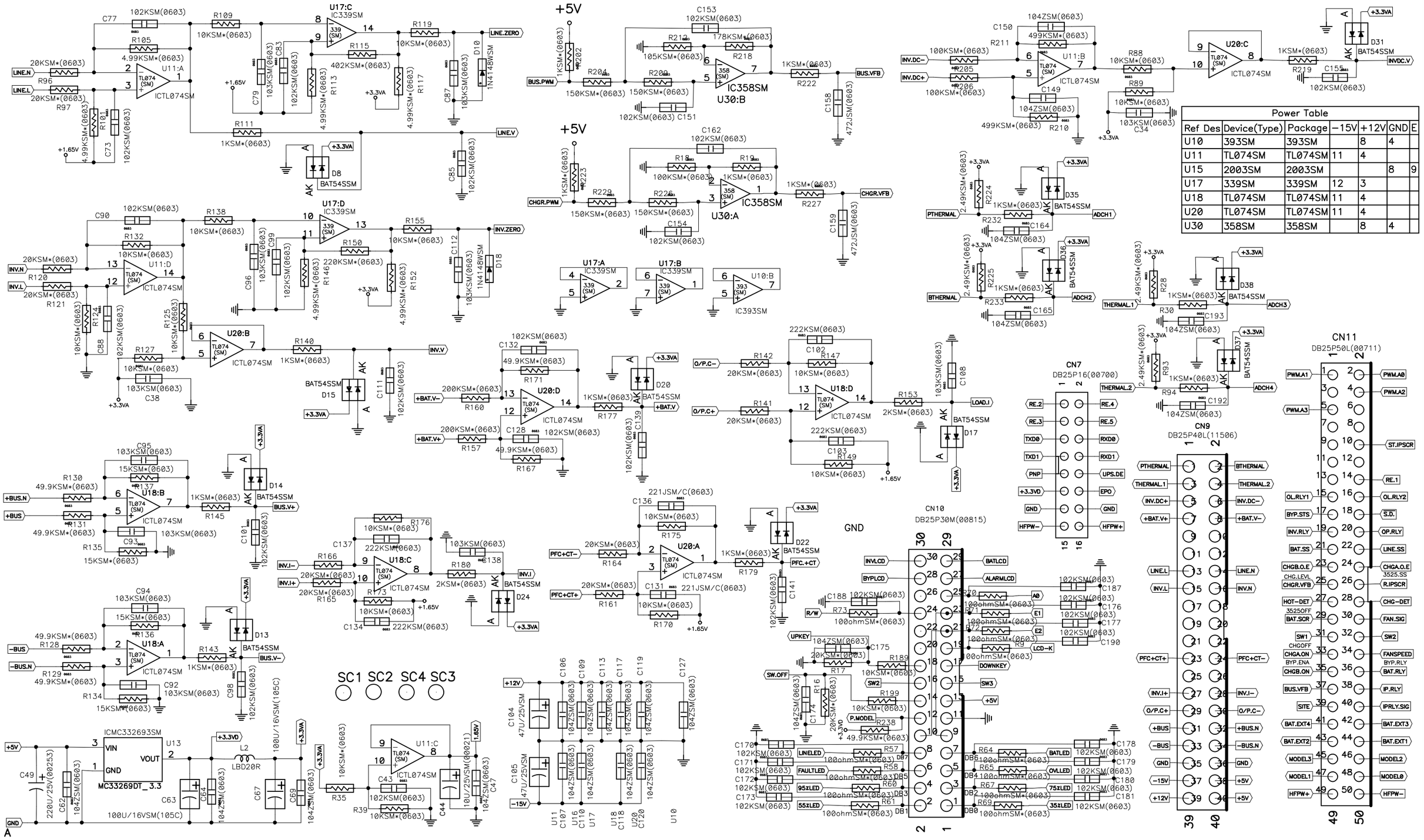
ECN:L1192008

A3

CONFIDENTIAL
DO NOT COPY

Part No: SK710-83405-02P	Sheet 1 of 2	Title: PW912X CNTL	Drawn: ChenYanyan 2008-05-08	Designer:	Checked:	Approved:
710-83405-02P	TP710-83405-02P	098-83405 -XX				

TC-RDW-49-23



Power Table						
Ref Des	Device(Type)	Package	–15V	+12V	GND	E
U10	393SM	393SM		8	4	
U11	TL074SM	TL074SM	11	4		
U15	2003SM	2003SM			8	9
U17	339SM	339SM	12	3		
U18	TL074SM	TL074SM	11	4		
U20	TL074SM	TL074SM	11	4		
U30	358SM	358SM		8	4	

PHOENIXTEC GROUP

REVISE: 02P

ECN:L1192008

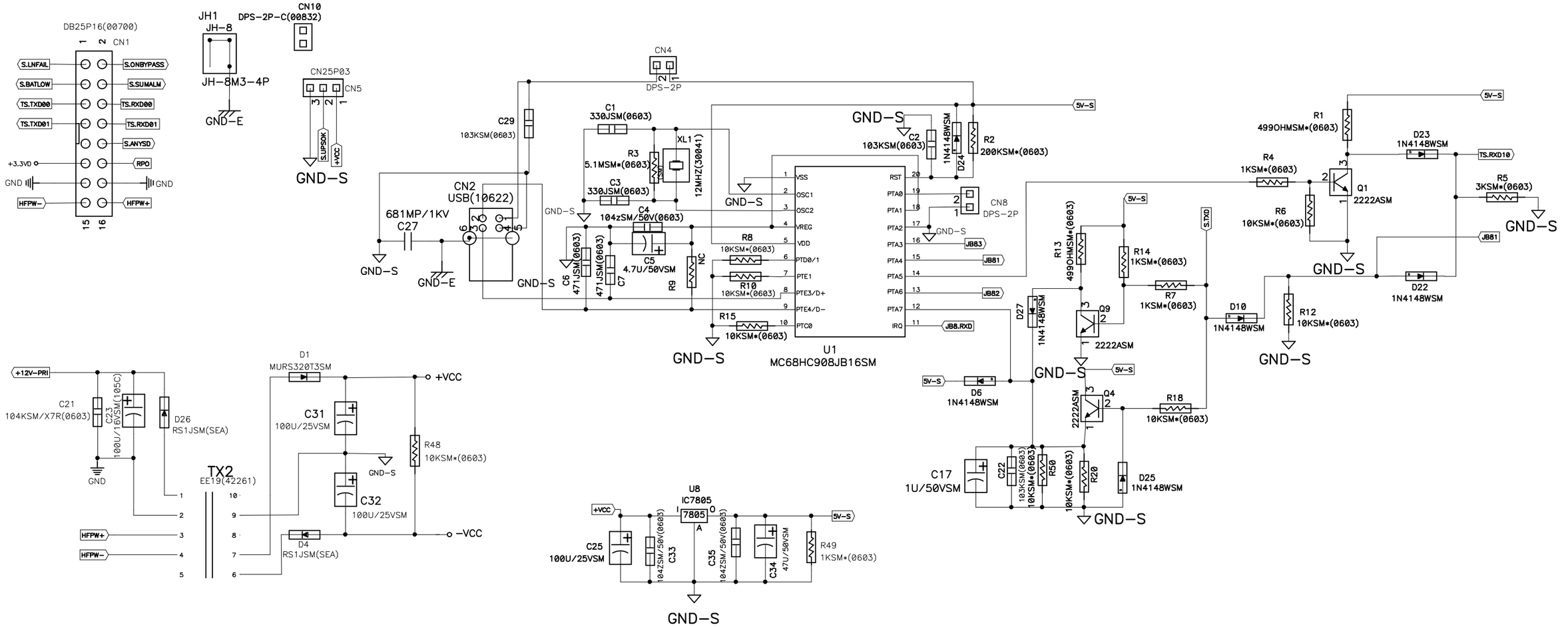
A3

CONFIDENTIAL
DO NOT COPY

Part No: SK710–83405–02P	Sheet 2 of 2	Title: PW912X CNTL	Drawn: ChenYanyan 2008–05–08	Designer:	Checked:	Approved:
710–83405–02P	TP710–83405–02P	098–83405 –XX				

TC–RDW–49–23

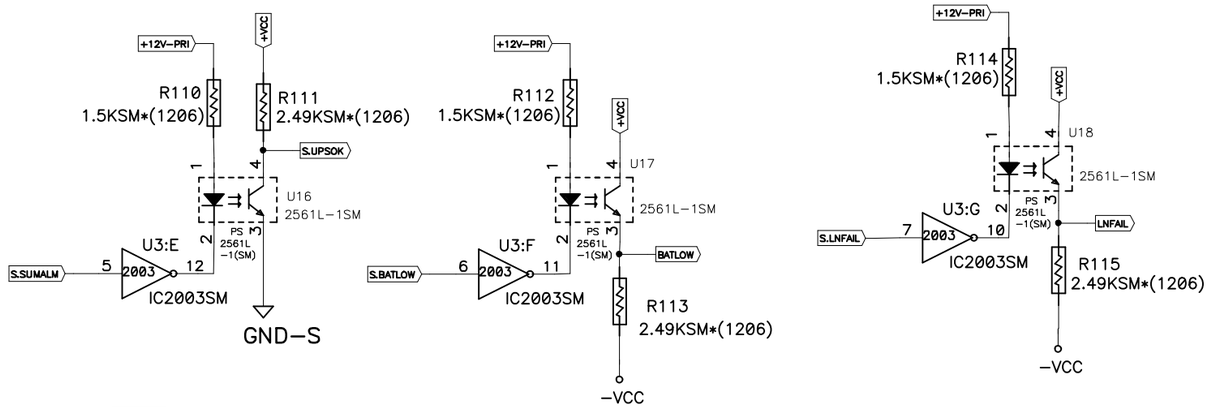
ODM CHENL(陈礼) 2008-7-23 14:10:09

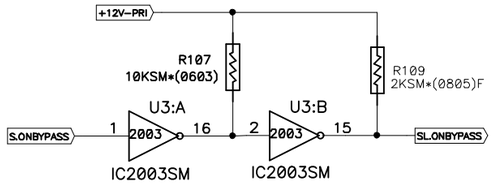


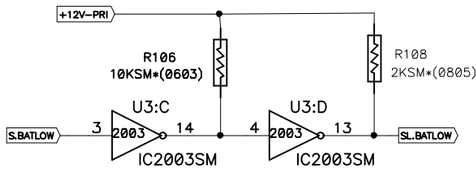
PHOENIXTEC GROUP	REVISE: 03P ECN:L2762008 A3		CONFIDENTIAL DO NOT COPY
Part No: SK710-00942-03P	Sheet 2 of 1	Title: PCB'Y INTERFACE 1083R PW	Drawn: CHENLIAN 2008/07/23
Designer: WANGPING 2008/07/23	Checked: XIEYAHONG 2008/07/23	Approved: XIEYAHONG 2008/07/23	
710-00942-03P	TP710-00942-03P	098-00942-01	

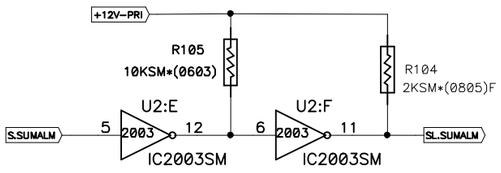
TC-RDW-49-23

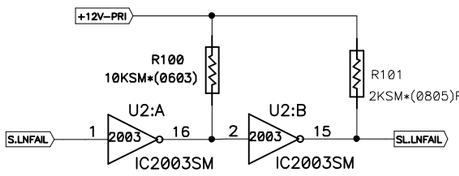
ODM CHENL(陈纶) 2008-7-23 14:10:09

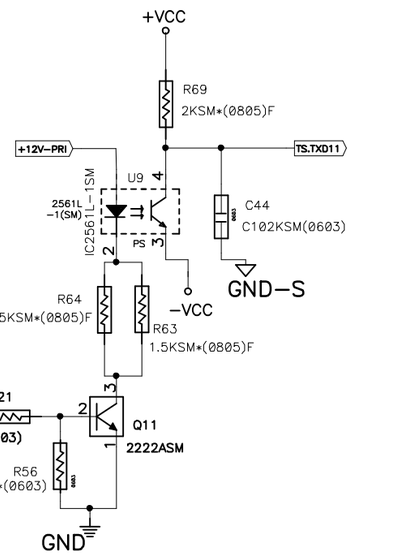


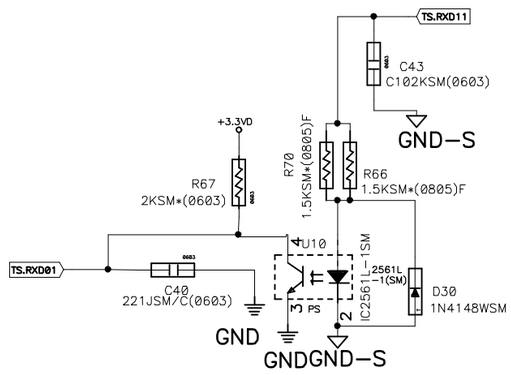


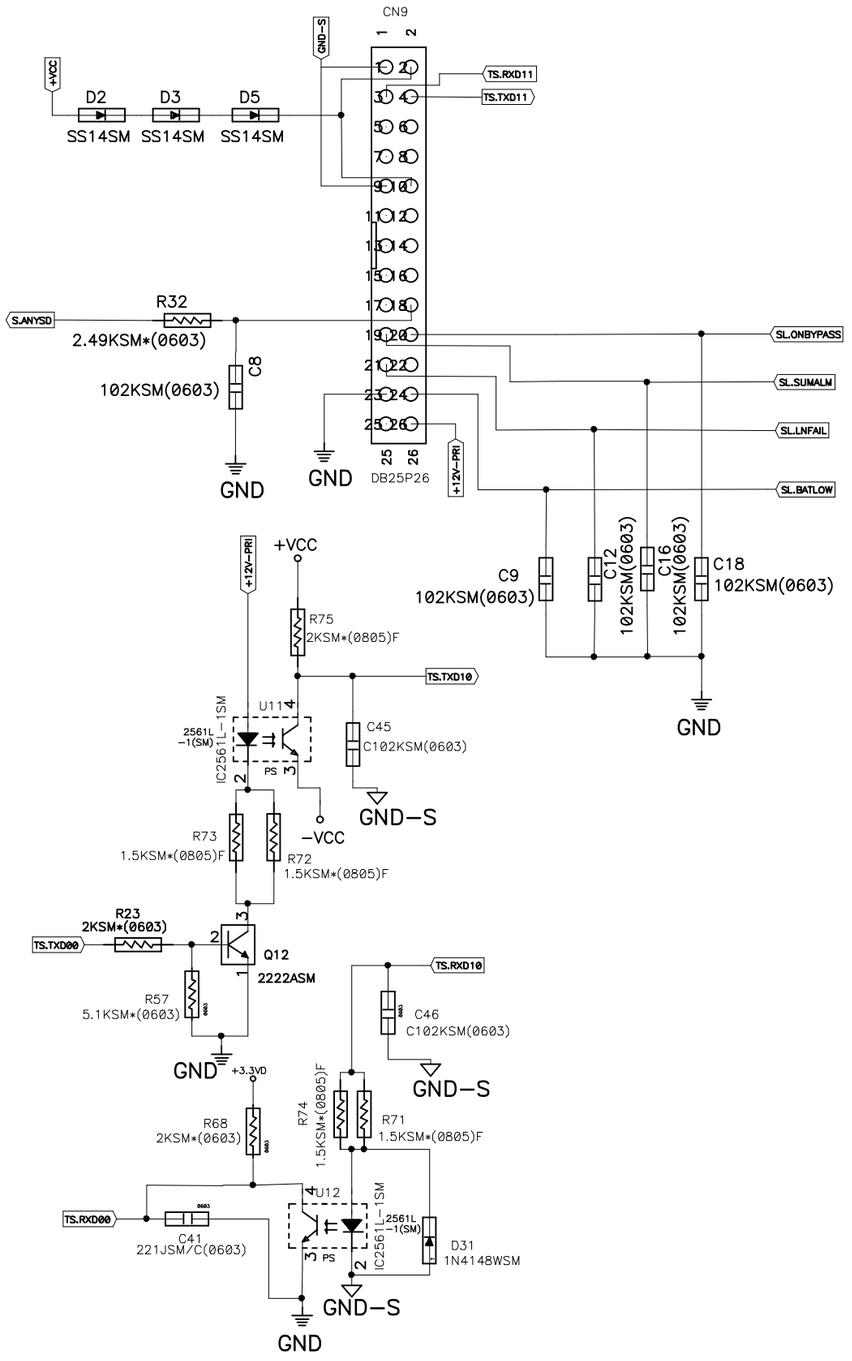








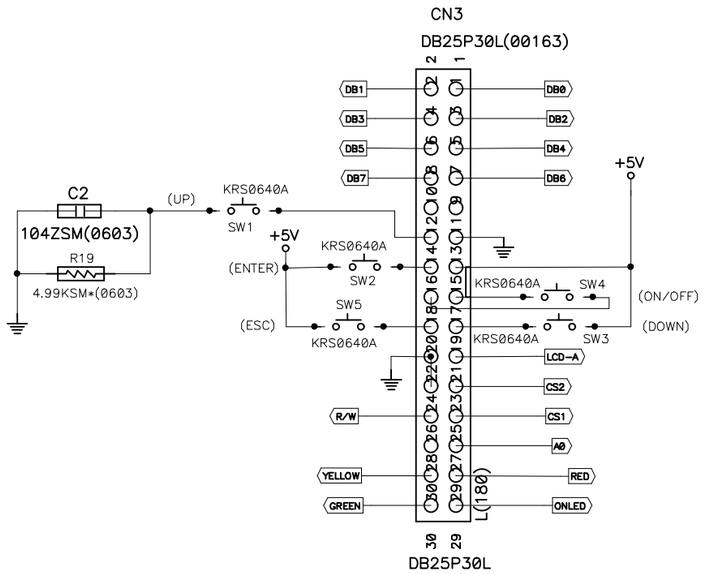


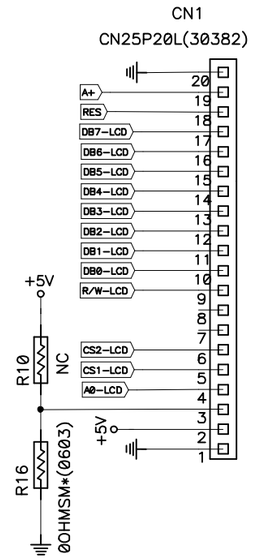


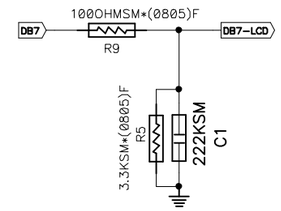
PHOENIXTEC GROUP	REVISE: 03P ECN:L2762008 A3		CONFIDENTIAL DO NOT COPY
Part No: SK710-00942-03P	Sheet 2 of 2	Title: PCB'Y INTERFACE 1083R PW	
710-00942-03P / TP710-00942-03P / 098-00942-01		Drawn: CHENLIAN 2008/07/23	Designer: WANGPING 2008/07/23
		Checked: XIEYAHONG 2008/07/23	Approved: XIEYAHONG 2008/07/23

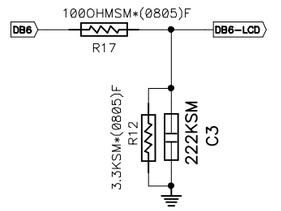
TC-RDW-49-23

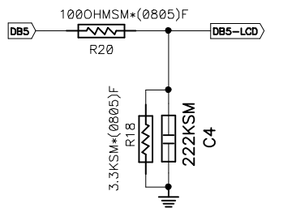
ODM DONGZH(董志海) 2008-6-10 13:37:22

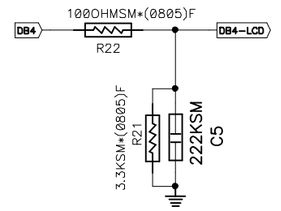


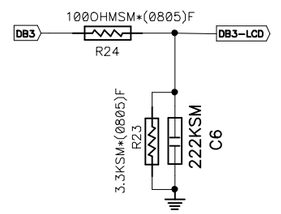


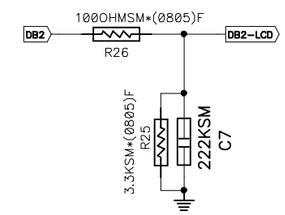


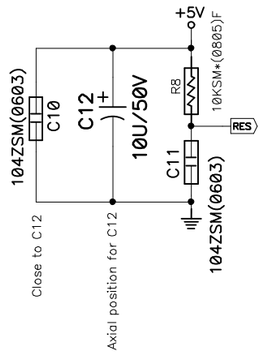


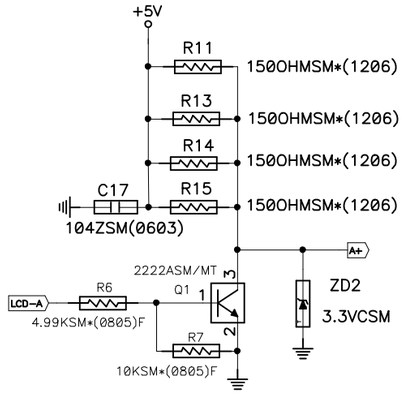


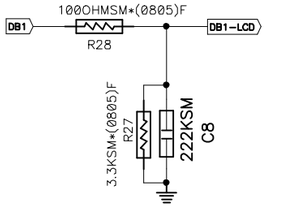


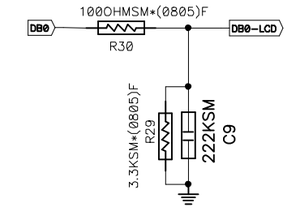


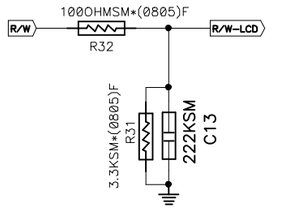












JP1 JP850(0.6) JP2 JP850(0.6) JP3 JP850(0.6) JP4 JP850(0.6)

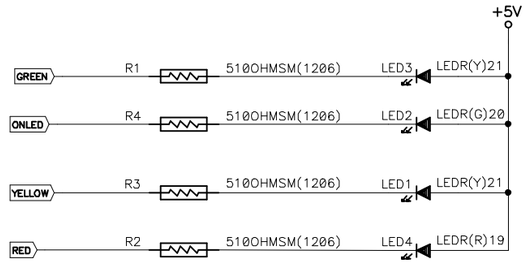
JP5 JP650(0.6) JP6 JP650(0.6) JP7 JP650(0.6) JP8 JP650(0.6) JP9 JP650(0.6) JP10 JP650(0.6) JP11 JP650(0.6)

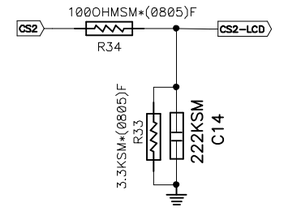
JP12 JP650(0.6) JP13 JP650(0.6) JP14 JP650(0.6) JP15 JP650(0.6) JP16 JP650(0.6) JP17 JP650(0.6)

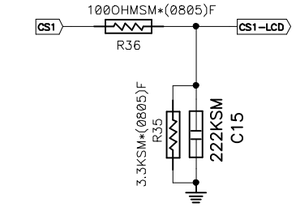
JP18 JP2000(0.6) JP19 JP2000(0.6)

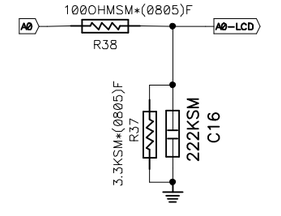
JP20 JP1500(0.6) JP21 JP1500(0.6)

JP22 JP1000(0.6) JP23 JP1000(0.6)





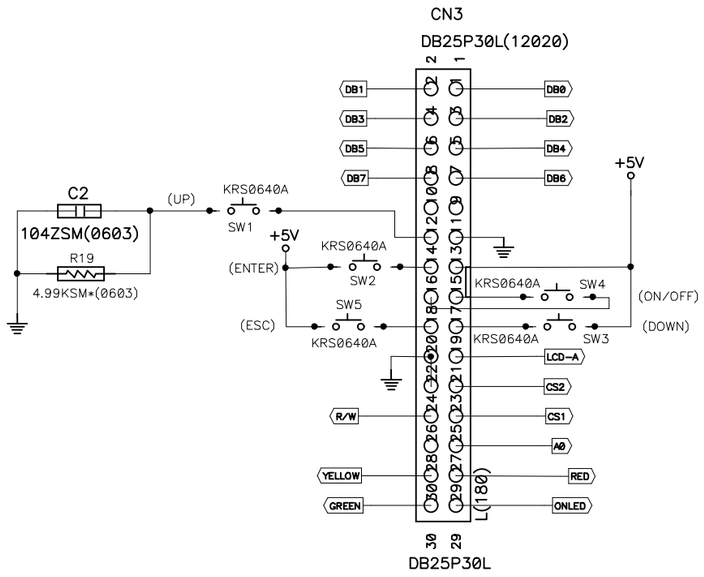


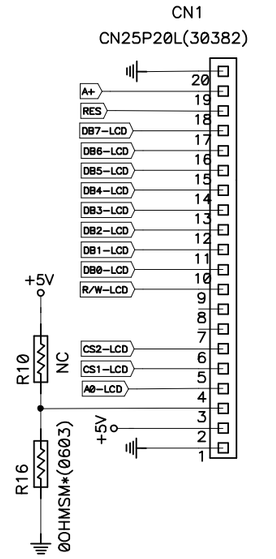


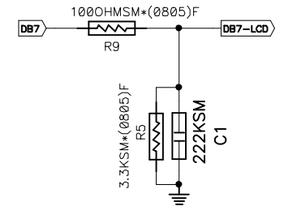
00P-E

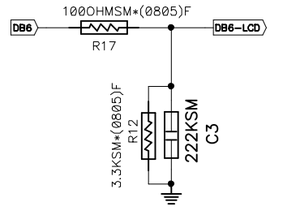
PHOENIXTEC GROUP	REVISE: 00P A3				CONFIDENTIAL DO NOT COPY
Part No: SK710-SK710-02871-00P	Sheet 1 of 1	Title: PW9130 tower LCD	Drawn: {Drawn By} 2008/05/30	Designer:	Checked:	Approved:
710-02871-00P	TP710-20871-00P	098-02871 -XX				

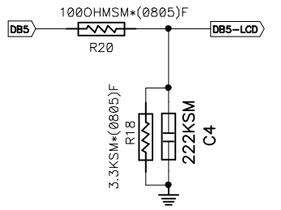
ODM DONGZH(董志海) 2008-7-24 11:36:19

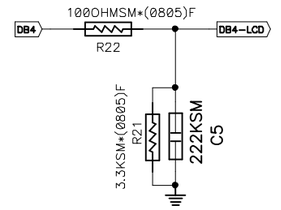


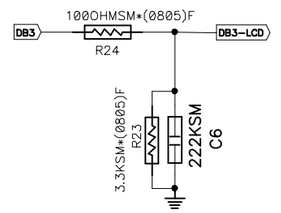


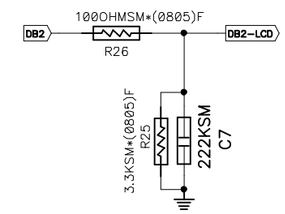


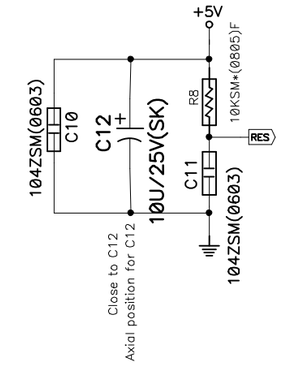


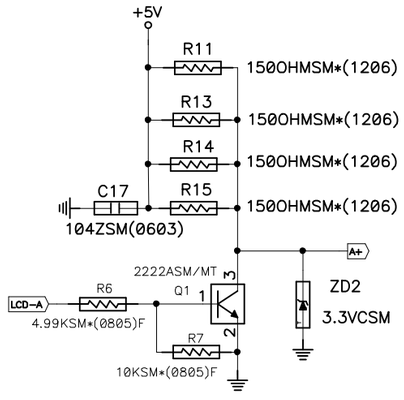


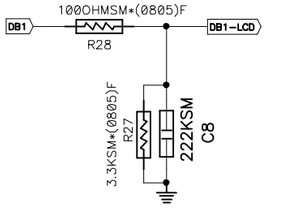


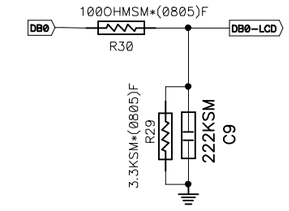


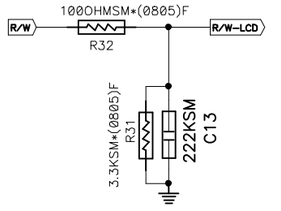












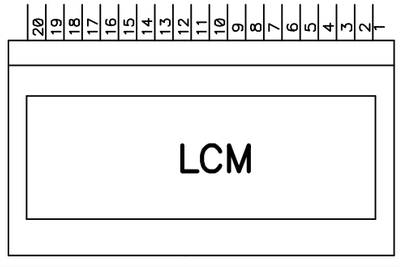
JP1 JP850(0.6) JP2 JP850(0.6) JP3 JP850(0.6)

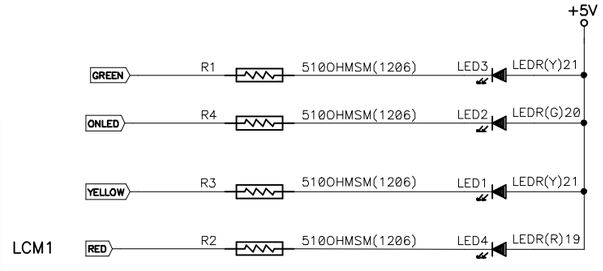
JP4 JP700(0.6) JP5 JP650(0.6) JP6 JP650(0.6) JP7 JP650(0.6) JP8 JP650(0.6) JP9 JP650(0.6) JP10 JP650(0.6) JP11 JP650(0.6)

JP12 JP650(0.6) JP13 JP650(0.6) JP14 JP650(0.6) JP15 JP650(0.6) JP16 JP650(0.6) JP17 JP650(0.6) JP18 JP650(0.6)

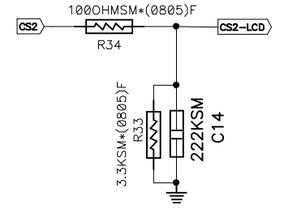
JP19 JP1400(0.6) JP20 JP1400(0.6)

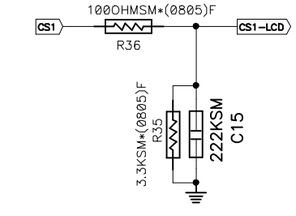
JP21 JP1000(0.6) JP22 JP1000(0.6)

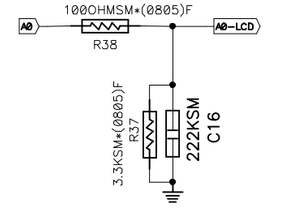




LCM1
LCM(00100)







02P-A

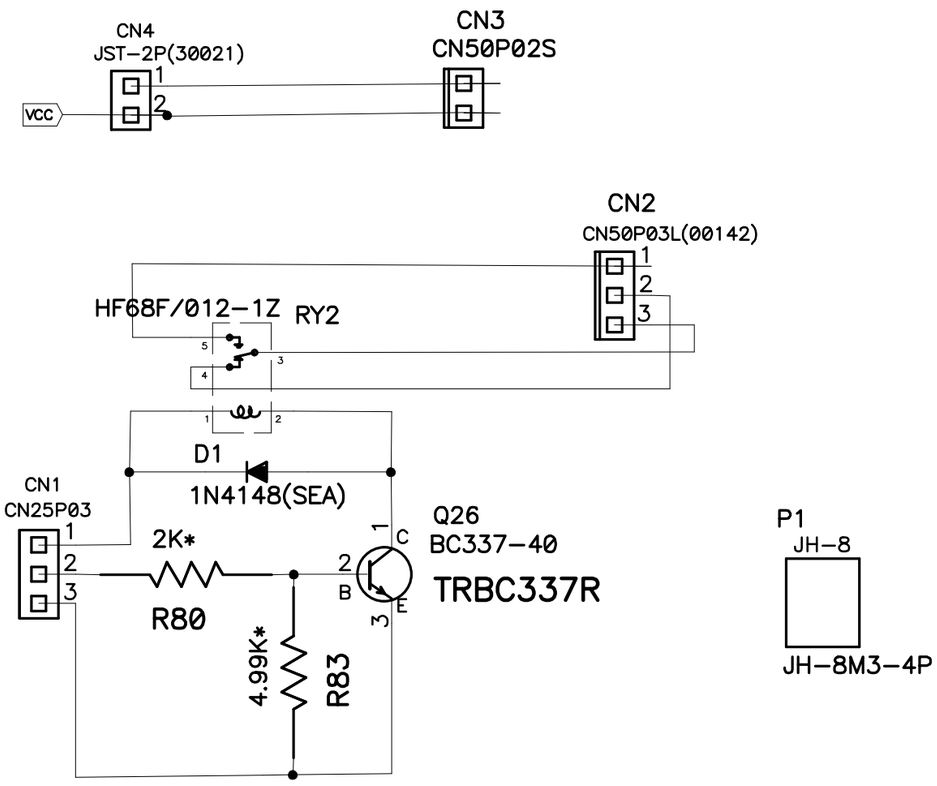
PHOENIXTEC GROUP

REVISE: 02P

A3

CONFIDENTIAL
DO NOT COPY

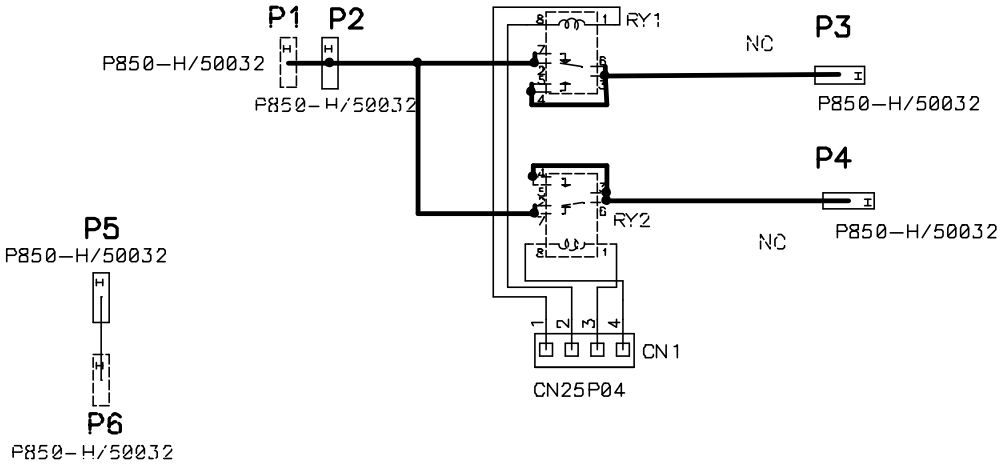
Part No: SK710-00938-02P	Sheet 1 of 1	Title: PW9130 TACK LCD	Drawn: ZOULL 2008/05/30	Designer:	Checked:	Approved:
710-00938-02P	TP710-00938-02P	098-00938 -XX				



01P-A

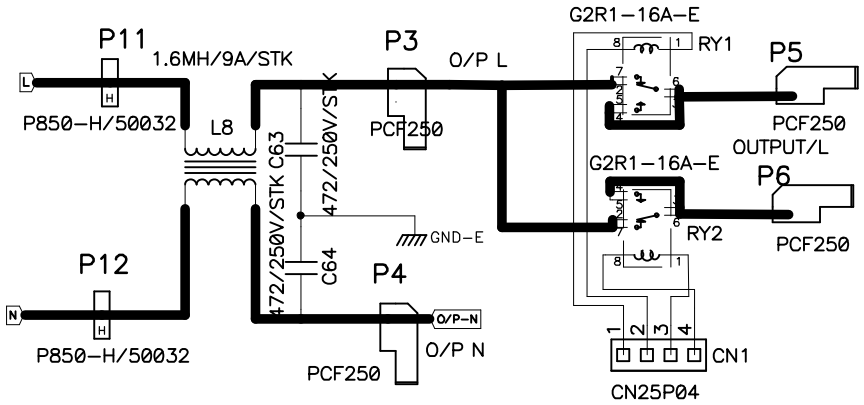
PHOENIXTEC GROUP	REVISE: 01P A4					CONFIDENTIAL DO NOT COPY
Part No: SK710-02863-01P		Sheet 1 of 1	Title: EPO&RELAY	Drawn: ZOULL 2007/12/21	Designer:	Checked:	Approved:
710-02863-01P	TP710-02863-01P	098-02863-XX				

ODM DONGZH(董志辉) 2008-7-24 11:39:13



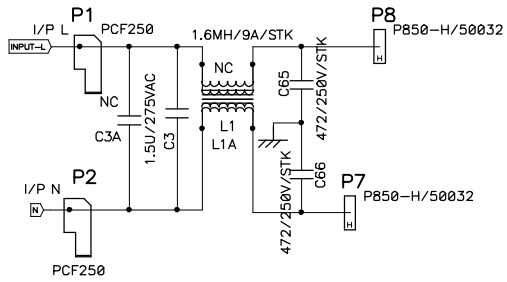
A

PHOENIXTEC GROUP	REVISE: 00P A4					CONFIDENTIAL DO NOT COPY
Part No: SK710-00953-00P	Sheet 1 of 1	Title: PCB'Y RELAY/10XX/P.W.	Drawn:	Designer:	Checked:	Approved:
710-00953-00P / TP710-00953-00P	098-00953-XX					



PHOENIXTEC GROUP	REVISE: A4					CONFIDENTIAL DO NOT COPY
Part No: SK710-		Sheet of	Title:	Drawn:	Designer:	Checked:	Approved:
710-	TP710-	098-					

TC-RDW-49-22

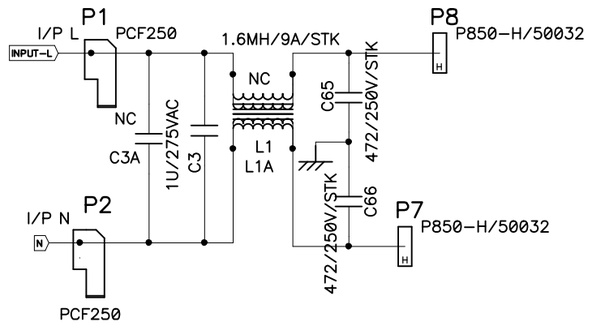


A

PHOENIXTEC GROUP	REVISE: 00P-A A3					CONFIDENTIAL DO NOT COPY
Part No: SK710-02895-00P	Sheet 1 of 1	Title: PCB'Y EMI 103X P.W.	Drawn:	Designer:	Checked:	Approved:
710-02895-00P	TP710-02895-00P	098- 02232 -XX				

TC-RDW-49-23

ODM DONGZH(董志海) 2008-7-24 14:07:04

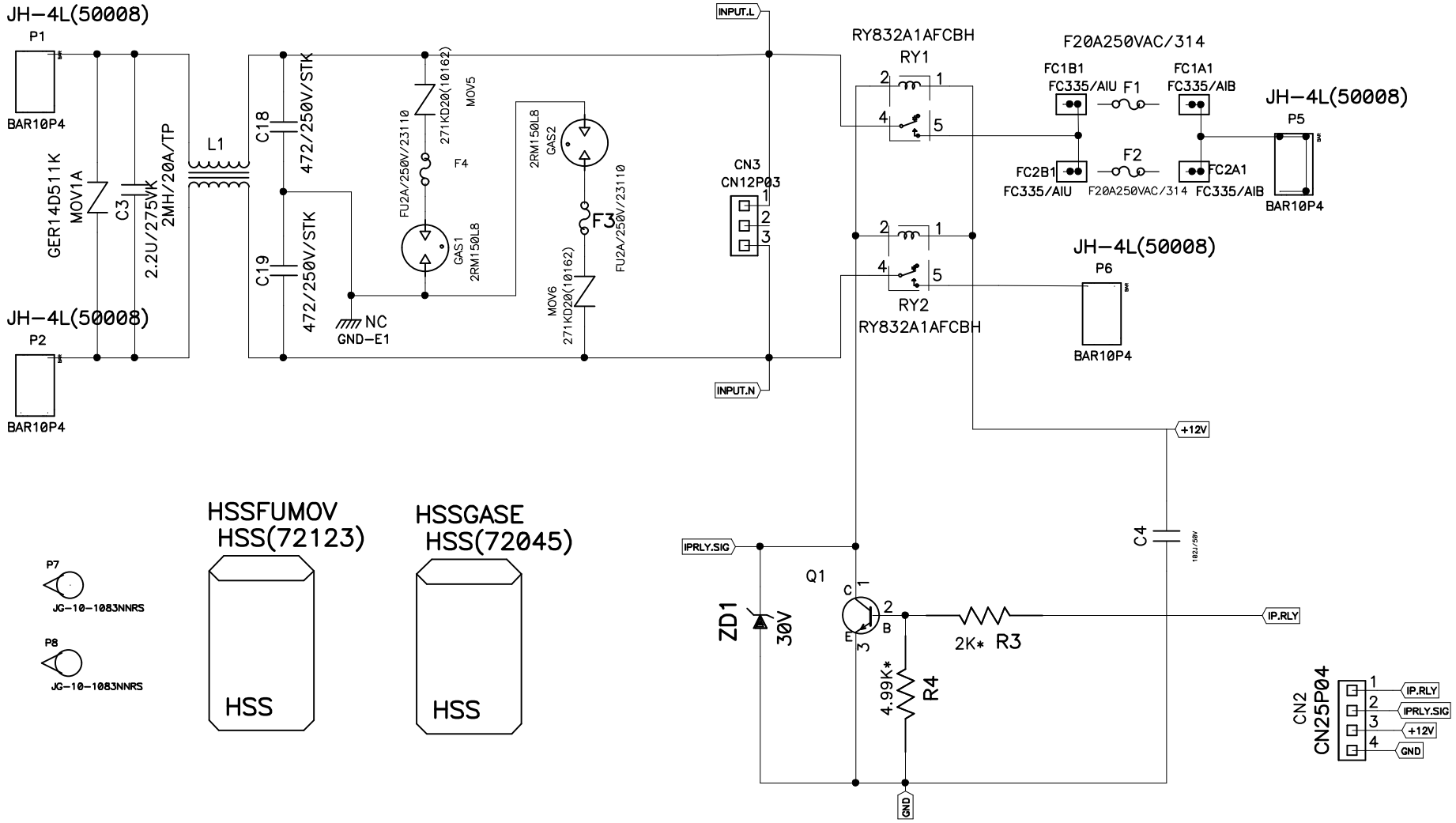


B

PHOENIXTEC GROUP	REVISE: 01P-B A3				CONFIDENTIAL DO NOT COPY
Part No: SK710-00940-01P-01	Sheet 1 of 1	Title: PCB'Y EMI 10X3 P.W.	Drawn:	Designer:	Checked: / Approved:
710-00940-01P / TP710-00940-01P	098-02232-XX				

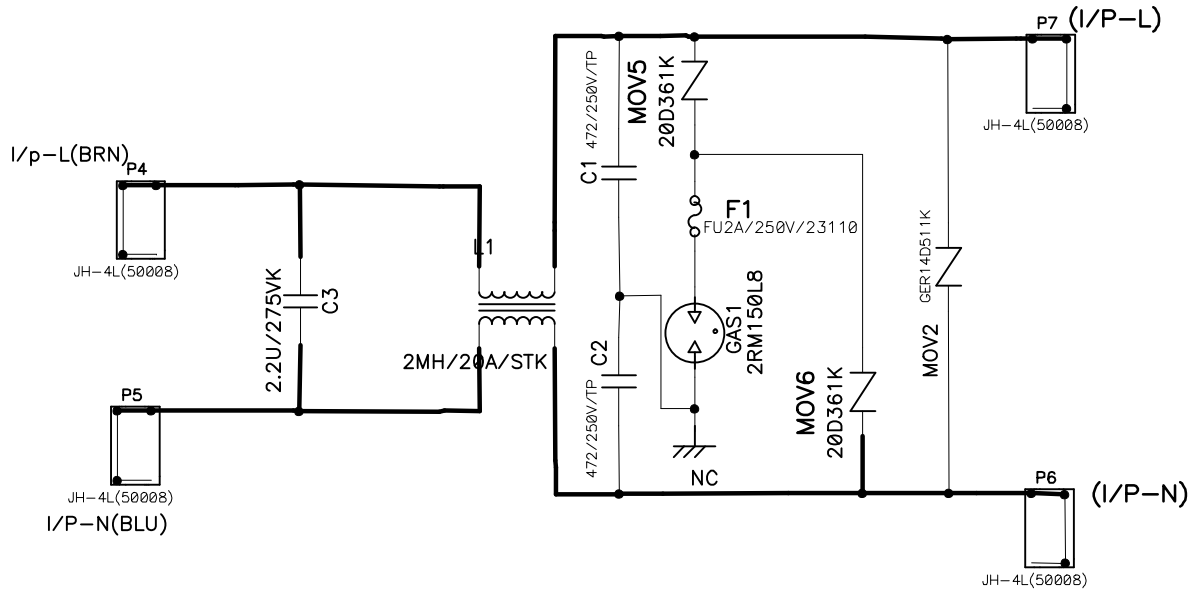
TC-RDW-49-23

ODM CHENYY(陈艳艳) 2008-8-12 16:22:39



D

PHOENIXTEC GROUP	REVISE: 00P A4					CONFIDENTIAL DO NOT COPY
Part No: SK710-02869-00P	Sheet 1 of 1	Title: 912X 2/3K HV IPEMI	Drawn: Chenyy	Designer:	Checked:	Approved:
710-02869-00P / TP710-02870-00P	098-02869-XX		2008-08-12			

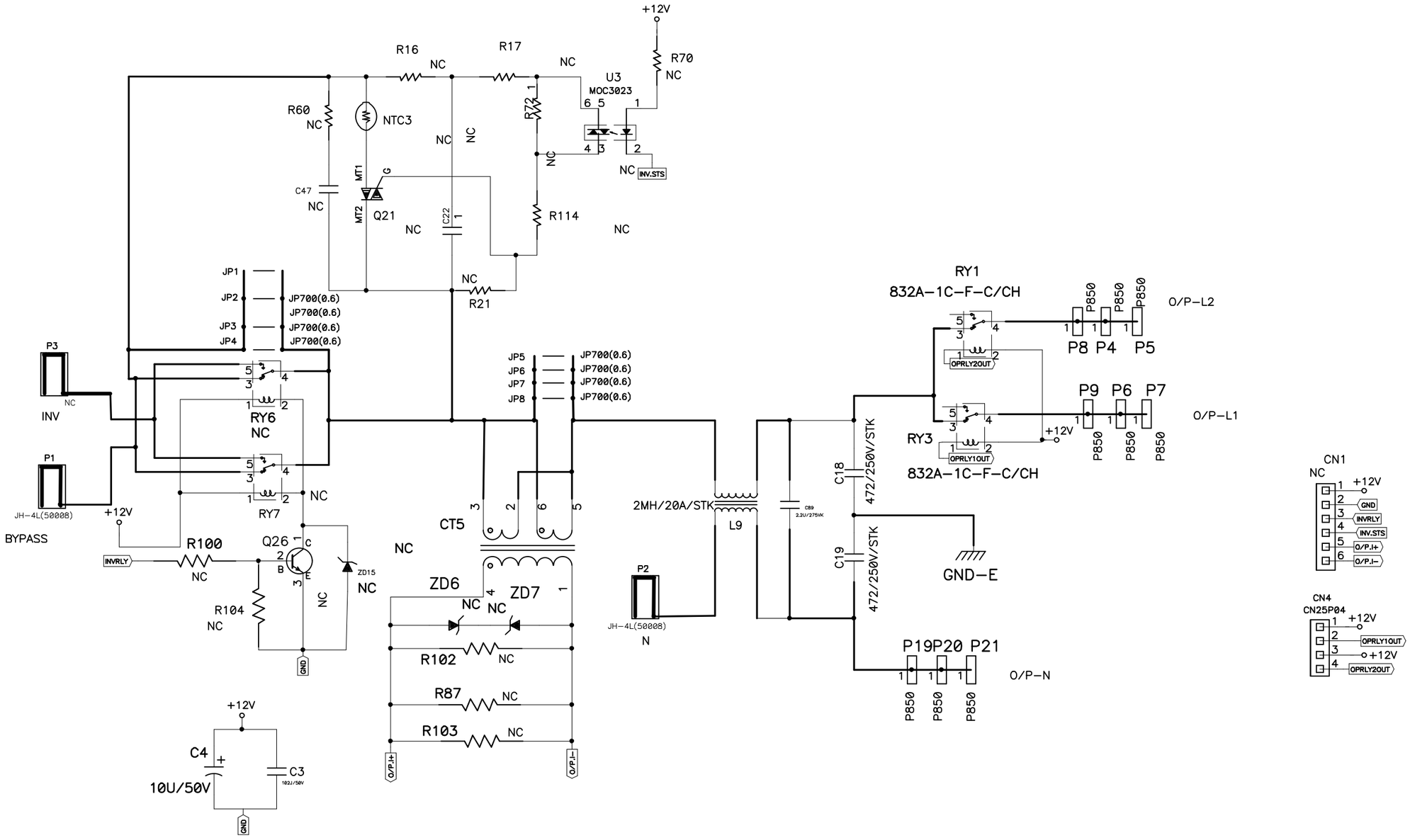


00P-A

PHOENIXTEC GROUP	REVISE: 00P-A A4					CONFIDENTIAL DO NOT COPY
Part No: SK710-00944-00P	Sheet 1 of 1	Title: 2/3K HV IP EMI	Drawn: ZOULL 2007/12/21	Designer:	Checked:	Approved:
710-00944-00P / TP710-00944-00P	098-00944-XX					

-

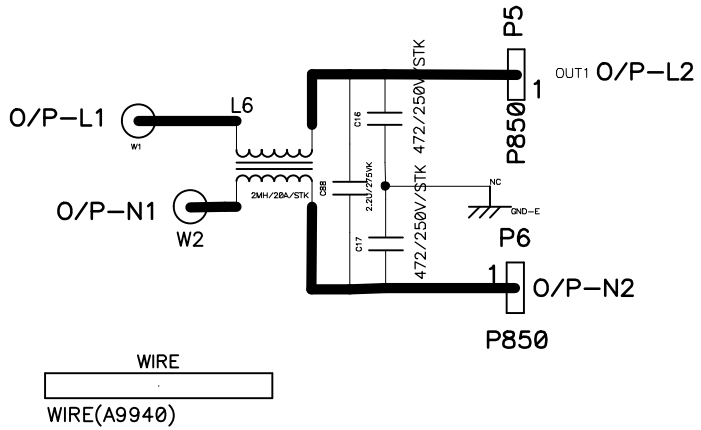
ODM CHENL(陈纵) 2008-6-30 17:05:08



B

PHOENIXTEC GROUP	REVISE: 00P A3					CONFIDENTIAL DO NOT COPY
Part No: SK710-02867-00P	Sheet 1 of 1	Title: PCB'Y OUTPUT EMI/912X TOWER HV/PW	Drawn: CHENLIAN 2008.3.11	Designer:	Checked:	Approved:
710-02867-00P	TP710-02867-00P	098-02867-XX				

TC-RDW-49-23



00P-D

PHOENIXTEC GROUP	REVISE: 00P A4					CONFIDENTIAL DO NOT COPY
Part No: SK710-00936-00P	Sheet 1 of 1	Title: FILTER OF(HV)	Drawn: ZOULL 2007/12/21	Designer:	Checked:	Approved:
710-00936-00P / TP710-00936-00P	098-00936-XX					