



GALAXY ELECTRONICS (INDIA) INC.

TECHNICAL MANUAL

FOR

TRUE-ON-LINE UPS SYSTEM

Modal - PT- 1 KVA TO 100KVA

BRAND :- (GALAXY)

Website: <http://www.galaxyups.com>

E-mail: manager@galaxyups.com

GALAXY ELECTRONICS (INDIA) INC

(ISO9001-2000 CERTIFIED ORGANISATION)

B-1/204, Lok Gaurav, L.B.S. Marg., Vikhroli (W), Mumbai - 400 083.

Tel. No. +91-22-2579 0461/1800, Fax. No. +91-22-2577 0487.

Letter from the Chief Executive Officer,

Dear Sir,

We congratulate you on buying the GALAXY system-popular for its performance & reliability

At GALAXY we have established stringent Production & Q.C. procedures to manufacture a trouble free and totally reliable system.

GALAXY enjoys a rich experience in Power Electronics and has a major presence in the Asian and African markets today. All our products are the outcome of a persistent endeavor to offer better technology and superior performance. Even in the future, we will strive to evolve the most effective products to meet your power problems & energy solutions.

At this juncture we would like to mention that a UPS system is meant to solve power problems at the site. Every product is a solution for the problems in the environment where the load is installed. The environment includes aspects like climatic conditions, local power conditions, connected & surrounding load, load-distribution, wiring & its rating, reversal of wiring and allied problems.

Although each system is functionally tested in the factory, final adjustment and tuning of the unit in your environment to solve the power problems is done by our engineer, at the site.

At this stage our engineer needs your co-operation for an initial period of few days, to get your operators acquainted with the UPS operation, to collect data on the working environment and to ensure that the product stabilizes & solves the power problems at your location. This co-operation is important since all site-related conditions do not get simulated on the first day of installation.

We also solicit your feedback on our products. It will greatly help us in fulfilling your requirements more accurately. We are sure you will get excellent performance from our systems and look forward to repeated orders from you.

We request you to read the chapter on "Precautions" before you start using our system.

With best wishes,

Signature

Date:

INTRODUCTION

We are proud to have you as one of our esteemed customers. Manufacturing of ups systems is backed up by Wide experience of the company in power electronics field. We manufacture UPS system professionally And are tested for reliability and long life

In the manual you will find operating instruction and safety precautions to be observed to avoid failures . We are sure that UPS will give you long trouble free services, IF the system is installed as per instruction And proper maintenance is done from time to time.

INDEX

- 01} DESIGNATION FOR PARTS
- 02} SITE PREPARATION AND ENVIRONMENTAL CONTROL
- 03} TECHNICAL SPECIFICATION
- 04} POWER WIRING DIAGRAM
- 05} FUNCTIONAL DESCRIPTION OF UPS SYSTEM
- 06} FRONT & BACK VIEW
- 07} METERING AND INDICATION VIEW
- 08} METERING AND INDICATION DESCRIPTION
- 9} FRONT & BACK SIDE GA DRAWING
- 10} TERMINAL STRIPS & SWITCHGERS DETAILS
- 11} SIDE VIEW (GA DRAWING)
- 12} CONTROL CARD DETAILS
- 13} PART LIST
- 14} INSTALLTION PROCEDURE
- 15} UPS POWERNING UP (ON/OFF) PROCEDURE
- 16} HOW TO REPORT FAILURE / DO S & DON'T

DESIGNATION FOR PARTS

1. RESISTOR	R
2. PRESET	P
3. CAPACITOR	C
4. CHOKE	L
5. TRANSFORMER	X
6. PULSE TRANSFORMER	PX
7. POTENTIAL TRANSFORMER	PT
8. CURRENT TRANSFORMER	CT
9. SHUNT	SH
10. DIODE	D
11. SCR	TH
12. SCR- SCR MODULE	LK
13. SCR-DIODE	LU
14. DIODE – DIODE MODULE	LU
15. IGBT	Q
16. INTEGRATED CIRCUIT	IC
17. LED	IL
18. DIGITAL PANEL METER	DPM
19. SWITCH	SW
20. KEY SWITCH	KS
21. RELAY / CONTACTOR	K
22. BREAKER {MCB, MCCBs}	CB
23. FUSE	F
24. HEAT SINK	HS
25. TERMINAL STRIPS	TS
26. TERMINAL BLOCK	TB
27. PRINTED CIRCUIT	PB
28. BUZZER	BZ
29. FAN	E

SITE PREPARATION

Before installation & commissioning the system following aspect should be taken into account

POWER SUPPLIESS

Electrical power distribution & wiring diagram shall be studied during the site preparation. While providing electrical Connection to the UPS system consideration shall be given for future expansion which is a key part of the design. The Computer power source through UPS system should be isolated from other Power system in the center. A dedicated Ground circuit for maximum protection is very essential.

ENVIRONMENTAL CONTROL

We recommend well ventilated & dust free environment for UPS installation Air-conditioned room Improve the efficiency and prolong the life of the unit. It's not a necessary, as the unit is designed to Operate in adverse Temperature Atmosphere. If the batteries are located in a separate room, The same shall be carefully ventilated.

TECHINICAL SPECIFICATIONS FOR 5.0 to 100KVA **ON-LINE UPS SYSTEM**

INPUT

Voltage	415V (15%-20%) THREE PHASE
Frequency	50Hz (+6%)
Power Walk in	1 Sec

OUTPUT

Voltage	415V (+1%) Three Phase
Frequency	50Hz. (-0.25Hz) in free running mode
Slew Rate	0.1Hz per Sec
Power Factor	0.6 Lag to unity
Waveform	Sinusoidal
Transient	fro o to 10% step load change, output voltage remains within +5% and recover Within 5 milliseconds.
THD	<3%
Crest Factor	3: 1
Over Load	125% for 10 min & 150% for 60 Sec.

ENVIRONMENT

Ambient Temperature	Operating -10C to 40C, Storage -10C to 70C
Relative Humidity	95% Max non-condensing
Altitude	1000M w/o derating
UPS Standard	IEC 146-4
MTBF	30,000Hrs.for UPS with static switch

GENERAL

Efficiency	>90%
EFT Burst	as per IEEE C 62.41
Surge Protection	as per VDE 0871 Class A
Noise Supression	<40db
Ingress Protection	IP-41

METERING

Seven Segment DISPLAY metering to read following parameters with users friendly mimic Drawing

- Output voltage
- Output current
- Output frequency
- Battery voltage
- Battery current (charge/discharge)

INDICATIONS

- Mains on
- Mains high
- Mains low
- Phase fail
- D.C high
- Battery low alarm
- Battery low trip
- UPS on
- Output high
- Output low
- Over Load
- UPS trip

PROTECTION

- Input, Output & Battery MCCB/MCB
- Semiconductors fuses for Rectifier & inverter Bridge
- Input Single Phasing
- Rectifier Over voltage / Output current
- Battery charging current limit
- Output over load & short circuit
- Output over voltage & under voltage

COMUNICATION (Optional

Software interface Via RS-232C

FUNCTIONAL DESCRIPTION OF THE UPS SYSTEMS

The main function of UPS system is to supply AC power to critical loads like computer, Medical equipment continuously irrespective of input Mains. These loads if directly connected to mains supply, interruption / fluctuations in voltage / frequency may create problems like data corruption's keyboard lock etc. UPS supplies clean power to computer which is totally isolated from mains input. In case of Mains failure it supplies power without break. UPS system consists of

- 1) Rectifier cum charger
- 2) Inverter
- 3) By-pass source

Mains input supply is given to line reactor / input transformers. This voltage is applied to full wave full controlled rectifier cum charger.

The D.C output of this rectifier with its inherently low ripple contents is connected to the inverter to the section through L-C filter. This filter removes mains ripple as well as prevents high ripple current from reaching the battery.

The battery is floating on the D.C bus at the inverter input via circuit breaker. In case of mains failure the inverter switches over to battery without any interruption in A.C output power. When Mains reappears, the rectifier / charger delivers D.C power to inverter as well as charges the battery. The appropriate mode of charging (normal/ float) is selected automatically, depending upon the state of battery.

The inverter section consists of an 3 half bridge IGBT modules with free wheeling diodes. Sine weighted PWM technique is used for inverter. The drive and the control power are derived from regulated D.C power supply using D.C-D.C converter. Output of Inverter Bridge is connected to the output transformers via A.C choke AC capacitor is connected to secondary. These L-C filters remove unwanted higher harmonics from the inverter output to obtain a low distortion sine waveform. The output voltage and frequency are regulated independently.

In case of inverter failure the load will be transferred automatically to mains through static switch or can be manually transferred to mains by using manual by-pass switch.

METERING AND INDICATION

METERS

Display consists of LCD display, up-down arrow keys & ack this display normally reads. Output voltage of RN & YN phase. Other parameter can be viewed by scrolling arrow keys

1) Input voltage

- a) RN
- b) YN
- c) BN

- 2) INPUT FREQUENCY
- 3) BATTERY CURRENT
- 4) BATTERY VOLTAGE
- 5) MAINS CURRENT
- 6) OUTPUT VOLTAGE

- a) UN
- b) VN
- c) WN

- 7) OUTPUT FREQUENCY
- 8) OUTPUT CURRENT

- a) U
- b) V
- c) W

MIMIC DIAGRAM INDICATIONS

MAINS

ON	Indication presence of input mains supply
HIGH	Indication mains voltage is above 475v ac & UPS is working on batteries.
FAIL	Indicates absence of input Mains supply
LOW	Indicates mains voltage is less than 325V ac & UPS is working on batteries.
SINGLE PHASING	Indicates absence of any phase as well as wrong connection of R,Y & B phase sequence At UPS input

D.C

HIGH	Indicates DC busbar voltage is above its specified limit & Rect is tripped. To reset put Mains MCB off and again ON.
ON	Indicates presence of DC busbar voltage.
LOW ALARM	This is additional audible indication for fault condition like battery low, output over Voltage, output under voltage & output overload
LOW TRIP	Indicates inverter trip condition because of battery discharged condition.

INVERTER

TRIP	Indicates inverter trip condition
ON	Indicates inverter is in condition
HIGH	Indicates inverter trip condition because of output voltage above 455V ac.
LOW	Indicates inverter trip condition because of output below 372V ac
OVER CURRENT	Indicates inverter trip condition because of over current.

STATIC SWITCH (Optional)

LOAD ON UPS	Load is working on UPS
LOAD ON MAINS	Load is working on Mains

SWITCH: - This switch is for **ON & OFF** the **UPS** system

TERMINAL STRIP, SWITCH GEARS & MANUAL BYPASS SWITCH

SWITCH GEARS

Mains breaker CB1 is the input breaker. It switch ON & OFF the input supply to UPS system. It is a Additional Protection for input over current. CB1 should be kept ON for 24 Hrs.

Battery breaker CB2 connect or disconnect the battery bank to the busbar of the UPS system. It should be kept On for 24Hrs

Load breaker CB3 is the UPS output breaker. It connects or disconnect the load from UPS system.

TERMINAL STRIPS

UPS

INPUT The mains supply is given to the UPS system from this terminal strip it has Red (R). Yellow (Y)Blue (B) and Neutral (N) terminal.

BATTERY Battery voltage or dc voltage is given to the UPS system from this terminal strip it has BATT +VE and –VE terminal

LOAD When UPS & load switch is ON. A constant 415 volts AC voltage is taken from this terminal Strip, Red (R) , Yellow (Y), Blue (B) and Neutral (N) terminal

STATIC SWITCH

MAINS The mains supply is given to the static switch from this terminal strip it has Red(R), Yellow(Y) Blue (B) and Neutral (N) terminal

UPS OUTPUT The mains supply is given to the static switch from this terminal strip it has U, V, W and Neutral(N) terminals

LOAD Static switch output supply (UPS/ bypass) is given to load taken from this terminal strip Red(R), Yellow(Y) Blue (B) and Neutral (N) terminal

PART LIST FOR 5.0 to 80KVA UPS SYSTEM

CB1	32 Amp to 200Amp. 3Pole MCCB, mains input breaker(As per KVA)
K1	20Amp to 200Amp. Input contactor
CT to CT3	As per KVA 200 / 01A mains feed back for controller / display
X1	3Ph. Input transformers
F1 to F3	25 Amp to 250Amp. Semi-conductor fuse for rectifier input
LK1 to LK3	57Amp to 250Amp./ 1600V SCR-SCR modules for rectifier
L1	DC
C1 TO C14	4700UF /250 V DC CAPACTIORS
CB2	32 Amp to 250 A /3 Pole MCCB , Battery Breaker
SH1	20 Amp to 250 A/ 75 MV DC feed Back shunt
F4	20Amp to250 AMP. HRC Fuse For Inverter Input
C15 to C32	4700 UF/250 V DC Capacitors
Q1 TO Q6	50AMP TO 300AMP ./1200 V IGBT modules for inverter
L2 to L4	AC Choke
X2	5.0KVA to80KVA Output Transformer
C33 TO C38	10 uf to30uF /440 v AC Capacitors.
CT4 TO CT9	20/10 A AC C.T for UPS output feed back for controller Display
Lk4 to LK9	92 Amp. /1600 v SCR-SCR module for static switch(optional)
CB3	20 AMP to 150 A/3 Pole MCCB , For UPS Output
SW1	Display power supply card ON /off switch
SW2	Inverter power supply card ON /off switch

SW3	Inverter power supply card ON /off switch
PT1	P:0-300, S:8-0-8, 200mAR phase input display feedback transformers
PT2	P:0-300, S:8-0-8, 200mAY phase input display feedback transformers
PT3	P:0-300, S:8-0-8, 200mA B phase input display feedback transformers
PT4 TO PB6	P:0-300, S:21-0-21 ,400mA feed back transformer for charger PCB
PT7	P:0-300, S:0-150 , U phase instantaneous output feedback transformer
PT8	P:0-300, S:0-150 , V phase instantaneous output feedback transformer
PT9	P:0-300, S:0-150 , W phase instantaneous output feedback transformer
PT10	P: 0-300,S:-8-0-8,8-0-8 ,100m A, U phase output feedback for voltage regulation & protection
PT11	P: 0-300,S:-8-0-8,8-0-8 ,100m A, V phase output feedback for voltage regulation & protection
PT12	P: 0-300,S:-8-0-8,8-0-8 ,100m A, W phase output feedback for voltage regulation & protection
PT13	P:0-300 ,S:8-0-8,200 m A , U phase output feedback transformer For display
PT14	P:0-300 ,S:8-0-8,200 m A ,V phase output feedback transformer For display
PT15	P:0-300 ,S:8-0-8,200 m A , W phase output feedback transformer For display
PT16	P:0-300, S: 12-0-12, 100mA , mains fail feed back transformer
PT17	P:0-300, S:21-0-21 ,200 mA , mains fail feedback for IFC -1 Pcb
PT18	P:0-300, S:21-0-21 ,200 mA , mains fail feedback for IFC -1 Pcb
PB1	CHAN3 Charger control card
PB2	69 MB Pluses control card
PB3	IFC-1 software interface control card
PB4	3PH3FM1 Main control card
PB5	3PHMB2 for driver PCB
PB6	3PHMB2 for driver card

PB7	3PHMB2 for driver card
PB8	HBPS For display power supply card
PB9	HBPS For Inverter power supply card
PB10	HBPS For Inverter power supply card
PB11	KWYSWM1 relay card
PB12	SNUBBER card
PB13	3PSI Static switch control card
PB14	6PMB Card
PB15	6PMB Card
PB16	FDBK12V feedback card for chan3m pcb
PB17	LCD display control card
PB18	LCD Power supply card
PB19	LCD Display card
PB20	NEWIND -1mimic display card
PB21	SNUBBER card
PB22	SNUBBER card
PB23	SNUBBER card
PB24	7815 PCB

INSTALLATION & COMMISSIONING PROCEDURE

A) VISUAL INSPECTION

Before commissioning system is visually inspected for physical damages and proper connections. Put all switches and MCB in OFF position.

B) COMMISSIONING

- Connect the input phase R-Y-N –Neutral to the terminal marked MAINS INPUT (R-Y-N) respectively
- Check proper earthing is done.
- Connect all the batteries in series using proper cable and then connect battery bank +VE to the battery Terminal strip.

C) PRE –OPERATING PRECAUTIONS

- All electrical external connection is properly done.
- Be sure that the ground connection is made and connected earth ground.

D) OPERATING INSTRUCTION

- Check the battery voltage.
- Check the D.C bus voltage on battery voltage meter on front panel.
- Switch on battery breaker after DC voltage is regulated.
- Check output load wiring and then switches on the output breaker.
- Connect the load step by step.
- Switch on inverter ON/OFF switches on front panel and observe output voltage on output voltmeter on front panel. It should rise softly and stabilize at 415V AC.
- Switch ON the input Breaker .Observe DC voltage on DC voltmeter. .It should develop softly & Stabilize at 110% at battery voltage.

UPS POWERING UO (ON/OFF) PROCEDURE

1. Ensure input supply is in the specified range.
2. switch input breaker on and observers the DC voltage rise to set voltage of 384V.DCcheck the voltage on LCD Meter also.
3. Then open the front doors of ups and locate switches SW1 to sw3 turn the switch to 1 position. By this Produce the dc-dc converter will become on and then will generate the control supply.
4. Then put the KEY switch ON the front panel to make inverter on and confirm output voltage and frequency OK.
5. For making the ups off follow the procedure in the reverser sequence.
6. For resting any trip condition make the ups off and follow the powering on procedure.
7. Check ups on dummy load for static switch function to transfer of load from ups to by pass line equipment after failing inverter.
8. For information regarding indication on panel refer to manual.

HOW TO REPORT THER FAILURE

1. When the system trips do not switch off inverter switch before observing indication on front panel.
2. Please refer metering & indication Drawing & description section.
3. Communicate & inform this status of indication to services at our office by telephone, fax or telegram.

DO, & DONT's

DO's

- Please check Mains supply indication and other indication before switching ON the UPS and computer.
- Keep UPS power points isolated from tube light, fan and other points.
- Keep UPS in ventilated space protected from rain dust wind and vibrations
- Incase of UPS failure please note down the indication before putting off INVERTER ON/OFF switch off.

DONT's

- Do not keep legers or heavy material on UPS.
- Do not block ventilation of UPS from sides also.
- Do not move the wires connecting UPS system or Batteries.
- Do not connect other loads like A/C, fans, Freeze, Water, Coolers etc
- Do not switch off mains supply to UPS system.
- Do not operate any switch on UPS when the computers are ON.
- Do not allow liquid to fall on UPS system.
- Do not restart the system before finding out the cause of tripping
- Do not service the UPS with the help of unauthorized person.

WARRANTY CERTIFICATE

System Description : *True – On – Line UPS*

Serial Number :

Rating :

Buyer :

This unit is warranty against all manufacturing and workmanship defects upto a period of 12 months from the date commissioning or 13 months from the date of supply, whichever is earlier.

This warranty is valid only if the unit is used to its electrical, mechanical and environmental specifications and no consequential damage are accepted under this warranty.

(Quality Control Department)

(Production Department)

Date :

(Company Seal)

APPENDIX A – 3

REPLY CARD

System Description :

Serial Number :

Rating :

Date of Dispatch :

Client Information

Name :

Address :

Contact Person :

Department :

Phone (with STD Code) :

Fax :

Dealer's Information

Name :

Address :

Contact Persons :

Department :

Phone(with STD Code) :

Fax :

(Dealer's Seal)

GALAXY ELECTRONICS (INDIA)INC. .

LIST OF REGIONAL OFFICES / SERVICE CENTERS

SR.	LOCATION	PHONE (S)	FAX (STD)
1.	PUNE (Sales & HO)	020- 40084939 09320003503 &5	020-40084940
2.	MUMBAI	022- 25791800 022-25790461 09820153583	022-25774087
3.	DELHI	09811101082	011-22022087
4.	HYDERABAD	9440040314	040-27069029
5.	AHAMDABAD	09825046408	
6.	Bangalore	09880179886	

HELP LINE EMAIL: manager@galaxyups.com

Section – IX

COMPANY PROFILE

GALAXY is promoted by

Mr. G. K. Singh, B. Tech. (Hons) – I.I.T. Bombay, M. B. A. – I.I.M. Calcutta are having wide experience in field of R & D, Production, Quality Control and Marketing. The organization specializes in offering cost effective solutions to various power- related problems. For last twenty five years, consistent growth in domestic and export markets has doubled the company's turn over every year. The company continues it's Growth through more value – added products. Its present list of products include:

- True – on – line UPS system
- Smart / UPS systems
- Constant Voltage Transformers
- Solid State Voltage Stabilizers
- Servo – Stabilizers
- Appliance – Protectors
- Sine – Wave Inverters
- Float – Chargers

For further details, you may visit our website : www.galaxyups.com

