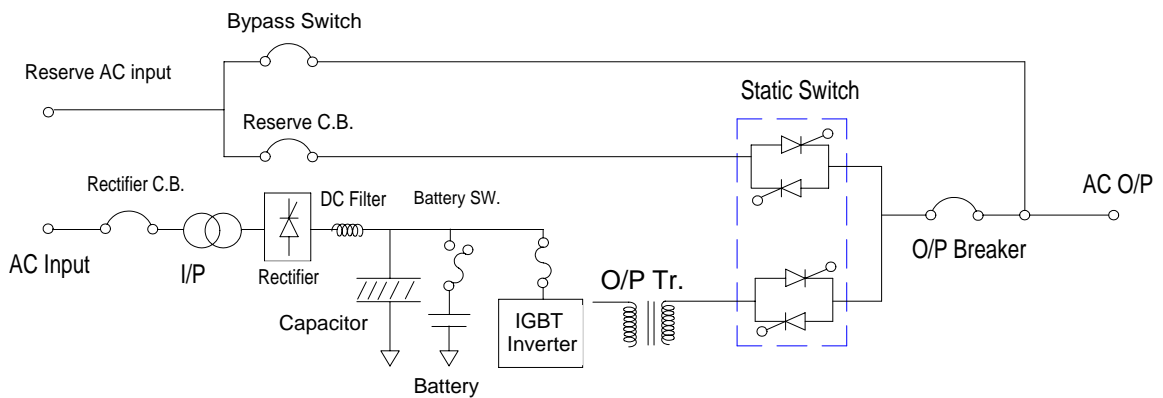


1. System Description

1.1 System Configuration



The UPS system consists of a rectifier, battery bank, inverter, static switch, circuit breaker, monitoring, and indicators.

Normal Operation:

In normal operational conditions, the UPS receives AC power and consequently transforms to DC power through rectifier for charging battery and supplying inverter. The inverter transforms DC power to stable and clean AC power for the various loads.

When the utility AC power is absent, the battery will instantly provide DC power to inverter for continuous operation. Hence, the UPS output will not be interrupted for insuring normal operation of the load.

Reserve AC Supply Mode:

When the inverter in abnormal situations, such as over temperature, short circuit, abnormal output voltage, the inverter will shutdown due to self-protection function. If the utility power is normal, the static switch shall transfer the load to the reserve source without interruption of power supply.

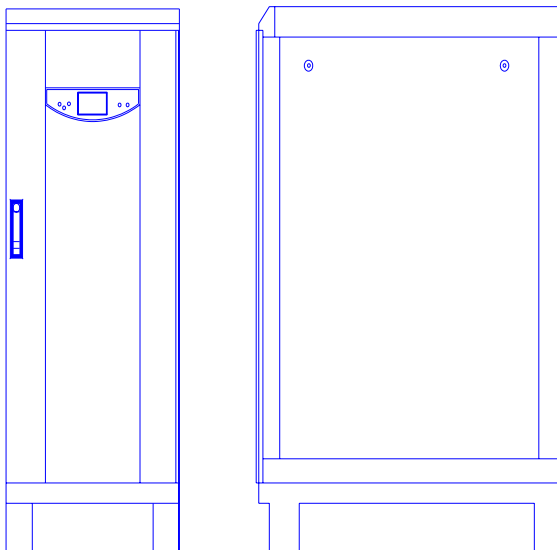
Maintenance Bypass mode:

During maintenance, turning off the inverter and all circuit breakers except the maintenance bypass switch keeps continuously power supply to the load. Risk will not exist in UPS for making sure safety of service personnel.

Note !

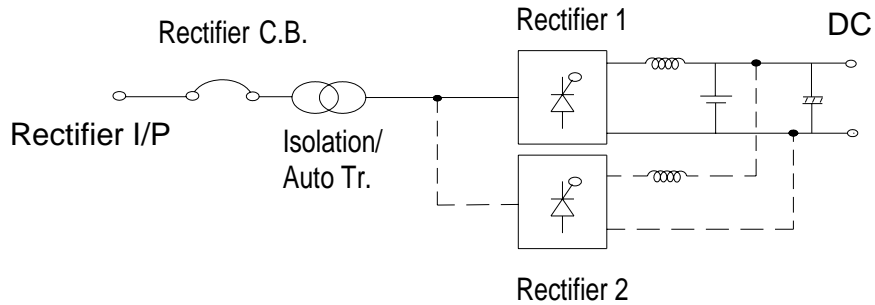
If only single mains power is available, please utilize the same power source for reserve AC input and rectifier input.

1.2 Profile Construction



The above diagrams are the foresight drawing and side-view drawing of the UPS profile frame-work. Regarding dimensions and weights information is detail listed in Section 1.8.

1.3 Rectifier

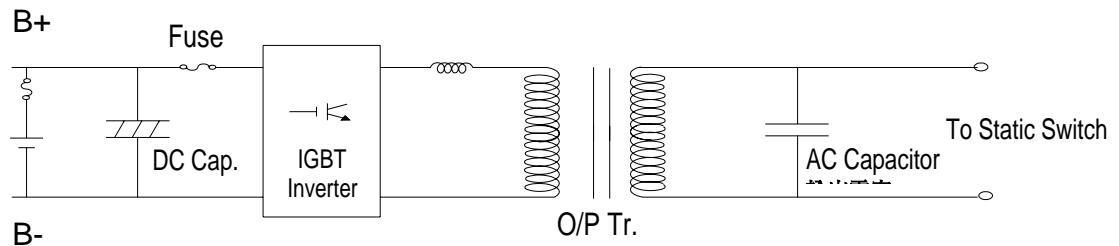


The rectifier transforms AC power to DC power and supplies to inverter, battery charger. Its input is protected by circuit breaker and current sensor that can protect input from over current. It also has the function of steady current charging (current limit is adjustable). The large capacity models can have option for 2 sets of rectifier (12 pulse rectifier) to reduce the harmonics of input current.

Another function of the rectifier is to charge the battery and the charge voltage can set in floating mode or boost mode. If the battery is discharged under 2 volts per cell and AC utility restores, the rectifier automatically goes into the boost mode and supplies sufficient current to charge the battery for the purpose of extending battery life and insuring the battery in a full charged condition.(The time of boost charge is adjustable).

To prevent the disturbance surges and inrush current of the input AC power source, the rectifier is soft started and DC bus voltage is set up over a time period of 20 seconds.

1.4 Inverter

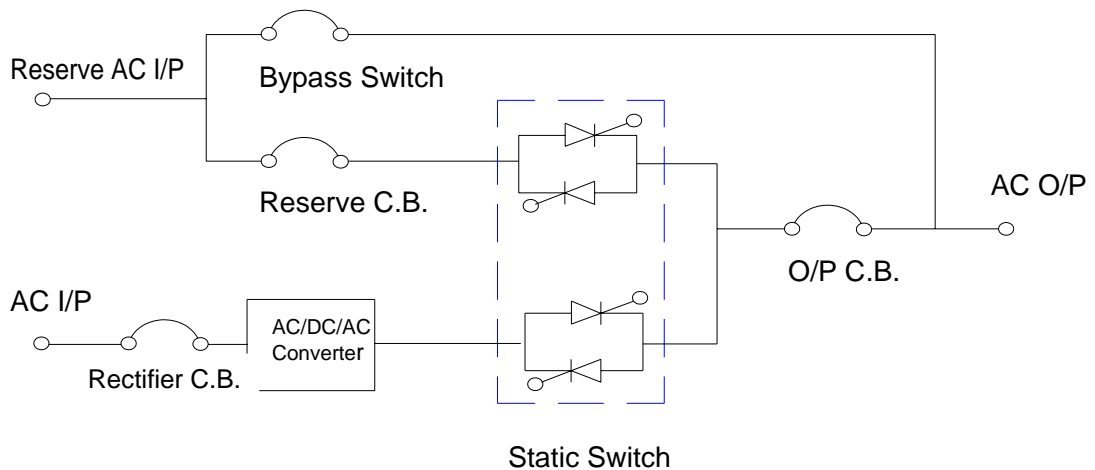


The purpose of the inverter is to convert the DC output of the rectifier or battery into AC power for accommodating different loads under all conditions. The inverter consists of IGBT transistors with full bridge circuit which is under control by sinusoidal pulse-width modulation (SPWM).

The frequency of the inverter is maintained in a phase locked condition with the reserve input frequency as long as the reserve input frequency is within a predetermined tolerance of nominal. If the frequency of utility power is beyond the predetermined tolerance, logical control circuit will lock phase using the crystal oscillating frequency.

The inverter has the protection of short circuit, over load and over temperature. The acceptable DC input range is between 300 and 400 Vdc, and the inverter output is connected to static switch.

1.5 Static Switch and Maintenance Bypass Switch

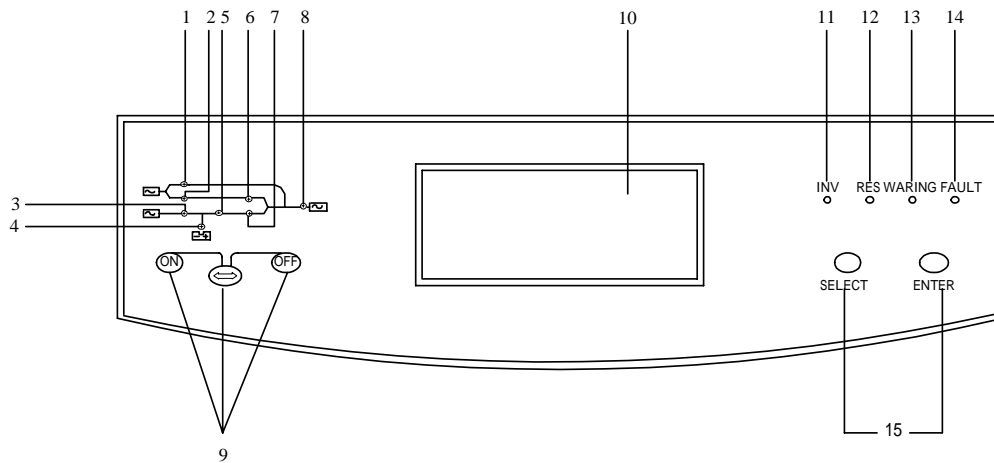


The static switch consists of SCR, and its function is to transmit the inverter AC output to external load.

When following conditions occur: 1. UPS shutdown due to DC low voltage, 2. Over temperature or fuse failure, 3. Inverter output over the permitted tolerance, 4. Inverter malfunction, 5. Inverter serious overload, the load will automatically transfer to the reserved AC source. When the over load condition is disappear, the static switch will again turn back the load to inverter. When reserved AC source voltage or frequency is over the permitted tolerance, the static switch will not transfer the load to reserved AC source.

When the UPS needs to be maintained, service personnel can consequently operate the UPS in bypass mode. The internal circuit is completely isolated from AC supply, and protects service personnel from electric shock.

1.6 Control panel



Front Panel

Explanation:

1. Bypass LED (red)--When LED lighted, the bypass switch is turn on.
2. Reserved AC source LED (green)--When LED lighted, UPS is supplied by the reserved AC source.
3. Rectifier LED (green)--When LED lighted, the rectifier is in operation ◦
4. Battery LED (red)--When LED lighted, the main power is failure, and output power is sustained by the battery bank.
5. Inverter LED (green)--When LED lighted, the inverter is in operation.
6. Reserved AC power LED (Yellow)--When LED lighted, the load is supplied power by reserved AC source through the static switch.
7. Inverter AC power LED (green)--When LED lighted, the load is supplied power by inverter through the static switch.
8. AC output LED (green)--When UPS is in normal output status, LED will be lighted.
9. Inverter control button--Press "ON" and "↔" in synchronization for turning on the inverter. Press "OFF" and "↔" in synchronization for turning off the inverter.
10. LCD display--Its used for message display.
11. Inverter LED (green)--When LED lighted, the load is supplied power by inverter.
12. Reserve AC LED (yellow)--When LED lighted, the load is supplied power by

reverse AC source.

13. Warning LED (yellow)--When LED lighted, one of the following condition is happen. The inverter will still operate, and the load is supplied power by inverter.

- Rectifier I/P abnormal
- Battery low
- Battery ground fault
- Inverter overload
- Reserve power failure
- Utility frequency abnormal

14. Emergency conditions (red)-- When LED lighted, one of the following conditions is happen, the load will switch to reserve AC source instantly.

- Rectifier high DC voltage
- Over temperature / Fuse fail
- Battery low stop
- Inverter abnormal

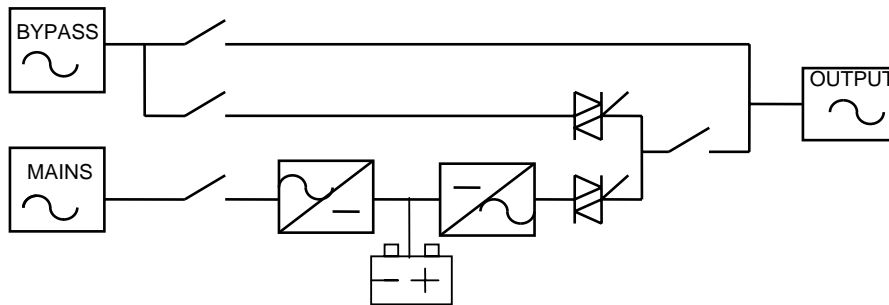
15. "SELECT" key and "ENTER" key--Used to select and set LCD display function.

16. Warning LED inside front panel:

● RES FREQ ABNORMAL
● RES MAINS FAIL
● LOAD ON RES
● INV FAULT
● INV OVERLOAD
● INV ON
● BATT GND FAULT
● LOAD LEVEL
● BATT LOW / STOP
● OVERTEMP / FUSE FAIL
● RECT HI DC STOP
● RECT MAINS FAIL

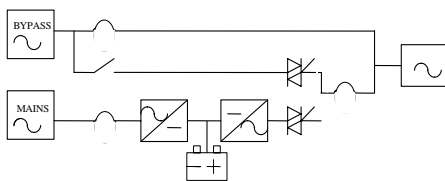
1.7 LCD Display

1. Initial display as follow:

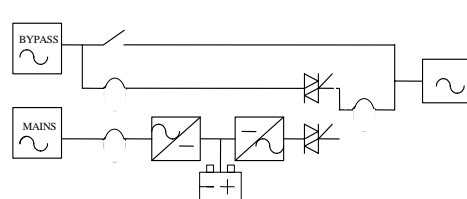


2. UPS status display as follows:

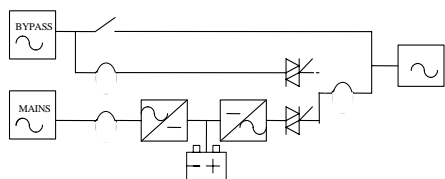
(1) LOAD ON BYPASS



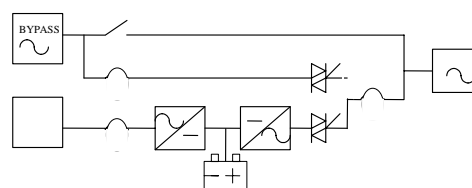
(2) LOAD ON RESERVE



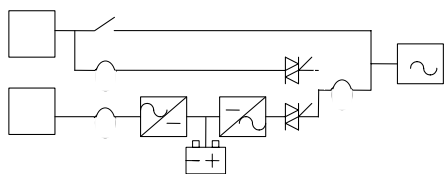
(3) LOAD ON INV.



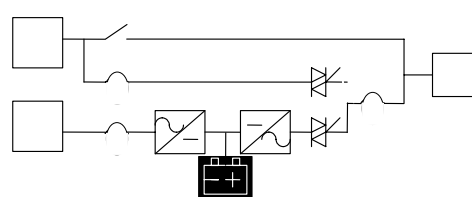
(4) LOAD ON BATTERY



(5) BATTERY LOW



(6) LOW SHUTDOWN



3. Measurement Display

(1) I/P,O/P Voltage & I/P Frequency

(2) O/P Load, O/P Current & Battery Voltage

AC: INPUT OUTPUT

R: 220V, 220V

S: 220V, 220V

T: 220V, 220V


 : 50Hz

LOADING OUTPUT

R: 110%, 60A

S: 110%, 60A

T: 110%, 60A

 : 400V

(3) I/P,O/P Voltage, & O/P Frequency

AC:INPUT OUTPUT

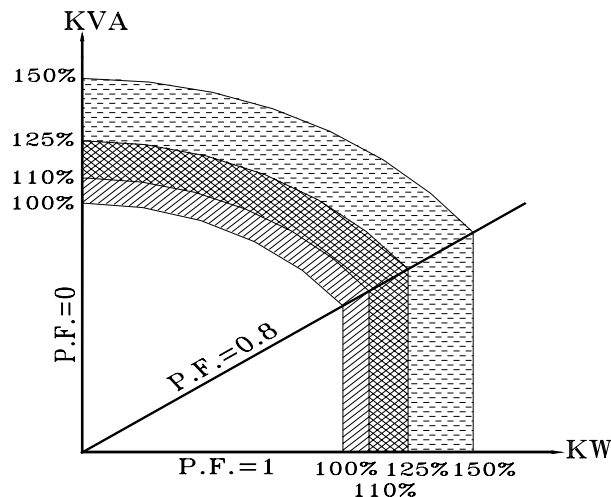
RS: 380V, 380V

ST: 380V, 380V

RT: 380V, 380V

 : 50Hz

***The load percentage is the ratio of load to UPS rated power output (power factor P.F.=0.8). If output P.F. \geq 0.8, the load percentage will be judged by rated KW value. If output P.F. $<$ 0.8, the load percentage will be judged by rated KVA value. Please see the following chart.



Therefore, according to the load percentage on LCD display, users can determine the moderate load.

4. LCD display when UPS in abnormal condition

(1) Inverter overload

**UPS INVERTER
OVERLOAD!**

Output current
is in excess of
110% loading.
Please reduce
output load!

(2) Inverter over current shutdown

**INVERTER OVER -
CURRENT STOP!**

Output current
is in excess of
200% loading.
Reduce load or
short circuit!

(3) Rectifier abnormal

**RECTIFIER HIGH
DC SHUTDOWN!**

DC bus voltage
too high!
Please consult
the maintenance
personnel.

(4) Over temperature or fuse failure

**OVERTEMPERATURE
FUSE FAILURE!**

Warning signal!
Check Inv. fuse
& cooling fan
before restart
the inverter.

(5) Battery ground fault

**BATTERY
GROUND FAULT!**

Please check
battery wiring
& any battery
fluid leakage.

5. Auxiliary Screen—Using “SELECT” & “ENTER” key to chose the following function.

**VIEW DATA Log
MEASURE Screen
DEMO UPS Screen
START UP Step
SHUTDOWN Step
INVERTER : (OFF)
INVERTER : (ON)
ALARM IS : (OFF)
UPS I. D. : (31)
LANGUAGE: (ENG)**

6. Function Setting

(1) Function key :

- a. Press SEL key: Used for selecting [Auxiliary Display].
- b. Press ENT key: To enter [Auxiliary Display] function. Press SEL key for setting the detail, and press again ENT key to complete the setting.
- c. Press ENT key twice: To change [Auxiliary Display] selecting direction.

(2) View data log: UPS historical records are displayed as follows:

**INTELLIGENT
U.P.S. DATA LOG**

BACKUP No. : xxxx
OVERLOAD No. : xxx
INV. Operating
x Years, xxx Days
xx Hours, xx Mins

(3) Measure screen: Press SEL key to display measurement data.

(4) Demo-UPS screen: Automatically demo the UPS status, measurement and abnormal status display.

(5) Start-up step: According to UPS status automatically indicates the start-up procedure step by step. The LCD display as follows:

SYSTEM START UP PROCEDURE

1. Close BYPASS MCB
2. Close RECTIFIER MCB
3. Close RESERVE MCB
4. Close OUTPUT MCB
5. Open BYPASS MCB
6. Close BATTERY FUSE
ISOLATOR
7. Press INV. ON & (CTRL) button simultaneously
8. Load on INV. Automatically

(6) Shutdown step: According to UPS status automatically indicates the shutdown procedure step by step. The LCD display are as follows:

SYSTEM SHUTDOWN PROCEDURE

1. Press INV. OFF & (CTRL) button simultaneous
2. Close BYPASS MCB
3. Open BATTERY FUSE
ISOLATOR
4. Open RECTIFIER MCB
5. Open RESERVE MCB
6. Open OUTPUT MCB
7. Wait 5 mins DC discharge
8. Open BYPASS MCB

(7) INVERTER ON : When ON is flashing, it indicates the inverter is ON.

(8) INVERTER OFF : When OFF is flashing, it indicates the inverter is OFF.

(9) UPS I.D.: Setting UPS Identification number (ID range: $1 \leq ID \leq 31$).

1.8 Technical Specification

DELTA 3Ø GES T-series UPS Technical data

		Power rating KVA (P.F.=0.8)	10	15	20	30	40	50	60	80	
Input	Nominal voltage	V	220/380 (*)								
	Voltage range	%	±20								
	Nominal frequency	Hz	50 / 60								
	Frequency range	%	±5								
	Nominal current	A	20	29	39	58	77	96	116	154	
	Maximum input current	A	28	41	55	82	109	136	163	218	
Output	Nominal voltage	V	220/380 (*)								
	Phase		3Ø4W+G								
	Nominal voltage adjustment range	%	±10								
	Waveform		Sinusoid								
	T.H.D. (with linear load)	%	≤3								
	Voltage regulation										
	—static	%	±1								
	—dynamic	%	±5								
	Nominal frequency	Hz	50 / 60								
	Frequency regulation										
—with internal oscillator	%	±0.01									
—with mains synchronize	%	±1									
Alarm	Buzzer	Load on battery					Discontinuous alarm				
		UPS abnormal					Continuous alarm				
Indication	LED status indication	UPS status indication: AC mains normal, reserve source normal, rectifier, inverter, static switch, and battery status indication.									
	LCD display	UPS abnormal display: inverter over-current shutdown, inverter overload, rectifier high DC voltage stop, low battery stop, over-temperature, fuse fail, and battery ground fault.									
Remote	Monitor	Input voltage and frequency, output voltage, current, and frequency, battery voltage and current, and load level self-diagnosis wisely.									
	Control	Multi-unit monitor, graphic display, and history data statistics.									
Static switch	Overload current capacity										
	—30 minutes	%								120	
system	—30 milliseconds	%								1000	
	Maximum transfer time :										
	—From inverter to reserve										
	a. inverter failure	msec								< 1	
	b. inverter overload or manual operation	msec								0	
—From reserve to inverter	msec								0		
Complete	Overall efficiency (at nominal load)	%	86	88	89	90	91	92	92	92	
	Inverter efficiency	%	88	90	91	92	93	94	94	94	
	Inverter overload		≤110% : 15 min		≤125%: 10 min		≤150% : 60 sec				
	Maximum power dissipated	KW	1.30	1.63	1.98	2.67	3.16	3.48	4.17	5.57	
	Audible noise (at a distance of 1.5m)	dBA								≤60	
	Ambient temperature	°C								0~40	
	Relative humidity (no condensate)	%								90	
	Dimensions :										
	—width	mm	600	600	600	600	600	800	800	1200	
	—depth	mm	800	800	800	800	800	800	800	800	
—height	mm	1700	1700	1700	1700	1700	1700	1700	1700		
Weight	kg	480	380	420	490	550	670	750	900		

(*) The different voltage specification is available.

DELTA 3Ø GES T-series UPS Technical data

Power rating KVA (P.F.=0.8)		100	120	150	160	
Input	Nominal voltage	V	220/380 (*)			
	Voltage range	%	±20			
	Nominal frequency	Hz	50 / 60			
	Frequency range	%	±5			
	Nominal current	A	193	231	289	308
	Maximum input current	A	272	326	408	435
Output	Nominal voltage	V	220/380 (*)			
	Phase		3Ø4W+G			
	Nominal voltage adjustment range	%	±10			
	Waveform		Sinusoid			
	T.H.D. (with linear load)	%	≤3			
	Voltage regulation :					
	—static	%	±1			
	—dynamic	%	±5			
	Nominal frequency	Hz	50 / 60			
	Frequency regulation :					
	—with internal oscillator	%	±0.01			
—with mains synchronize	%	±1				
Alarm	Buzzer	Load on Battery	Discontinuous alarm			
		UPS abnormal	Continuous alarm			
Indication	LED status indication	UPS status indication: AC mains normal, reserve source normal, rectifier, inverter, static switch, and battery status indication.				
	LCD display	UPS abnormal display: inverter over-current shutdown, inverter overload, rectifier high DC voltage stop, low battery stop, over-temperature, fuse fail, and battery ground fault. Input voltage and frequency, output voltage, current, and frequency, battery voltage and current, and load level self-diagnosis wisely.				
Remote	Monitor	Multi-unit monitor, graphic display, and history data statistics.				
	Control	Inverter/horns remote control, password setting, fault information reading, and auto-dialer.				
Static switch	Overload current capacity			120		
	—30 minutes	%				
	—30 milliseconds	%		1000		
	Maximum transfer time :					
	—From inverter to reserve					
a. inverter failure	msec		< 1			
b. inverter overload or manual operation	msec		0			
—From reserve to inverter	msec		0			
system	Overall efficiency (at nominal load)	%	92	92	92	92
	INVERTER efficiency	%	94	94	94	94
	INVERTER overload		≤ 110% : 15 min	≤ 125%: 10 min	≤ 150% : 60 sec	
	Maximum power dissipated	KW	6.98	8.35	10.4	11.13
Complete	Audible noise (at a distance of 1.5m)	dBA			≤ 60	
	Ambient temperature	°C			0~40	
	Relative humidity (no condensate)	%			90	
	Dimensions :					
	—width	mm	1200	1200	1200	1200
	—depth	mm	800	800	800	800
	—height	mm	1700	1700	1700	1700
	Weight	kg	1050	1200	1400	1450

(*) The different voltage specification is available.

DELTA 3Ø GES T-series UPS Technical data

		Power rating KVA (P.F.=0.8)	10	15	20	30	40	50
Input	Nominal voltage	V	220/380 (*)					
	Voltage range	%	±20					
	Nominal frequency	Hz	50 / 60					
	Frequency range	%	±5					
	Nominal current	A	20	29	39	58	77	96
	Maximum input current	A	28	41	55	82	109	136
Output	Nominal voltage	V	220 (*)					
	Phase	V	1Ø2W+G					
	Nominal voltage adjustment range	%	±10					
	Waveform		Sinusoid					
	T.H.D. (with linear load)	%	≤3					
	Voltage regulation :							
	—static	%	±1					
	—dynamic	%	±5					
	Nominal frequency	Hz	50 / 60					
	Frequency regulation :							
—with internal oscillator	%	±0.01						
—with mains synchronize	%	±1						
Alarm	Buzzer	Load on battery	Discontinuous alarm					
		UPS abnormal	Continuous alarm					
Indication	LED status indication	UPS status indication: AC mains normal, reserve source normal, rectifier, inverter, static switch, and battery status indication.						
	LCD display	UPS abnormal display: inverter over-current shutdown, inverter overload, rectifier high DC voltage stop, low battery stop, over-temperature, fuse fail, and battery ground fault. Input voltage and frequency, output voltage, current, and frequency, battery voltage and current, and load level self-diagnosis wisely.						
Remote	Monitor	Multi-unit monitor, graphic display, and history data statistics.						
	Control	Inverter/horns remote control, password setting, fault information reading, and auto-dialer.						
Static switch	Overload current capacity							
	—30 minutes	%	120					
	—30 milliseconds	%	1000					
	Maximum transfer time :							
	—From inverter to reserve							
a. inverter failure	msec	< 1						
b. inverter overload or manual operation	msec	0						
—From reserve to inverter	msec	0						
system	Overall efficiency (at nominal load)	%	86	88	89	90	91	91
	INVERTER efficiency	%	88	90	91	92	93	94
	INVERTER overload		≤ 110% : 15 min		≤ 125%: 10 min		≤ 150% : 60 sec	
	Maximum power dissipated	KW	1.30	1.63	1.98	2.67	3.16	3.96
	Audible noise (at a distance of 1.5m)	dB(A)	≤ 60					
Complete	Ambient temperature	°C	0~40					
	Relative humidity (no condensate)	%	90					
	Dimensions :							
	—width	mm	600	600	600	600	600	800
	—depth	mm	800	800	800	800	800	800
	—height	mm	1700	1700	1700	1700	1700	1700
Weight	kg	460	350	390	450	500	630	

(*) The different voltage specification is available.

2. Instructions for Installation

2.1 Location Environment and Safety Precaution

For ensuring UPS normal operation , prolonging UPS lifetime, and protecting UPS from disorder and malfunction, user should select optimal installing location and environment according to the following instructions, and observe the noticed items of safety.

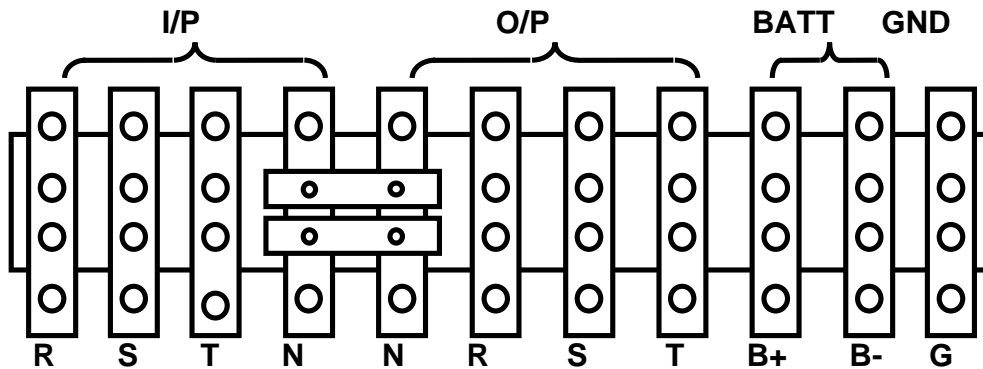
1. The weight of the UPS system (see paragraph 1.8) is concentrated on a relatively small floor area due to the cabinet design. The installing location must therefore have a sufficient floor loading capacity adequate to bear the load.
2. The UPS should be located on place with good ventilation. Its rear panel should be kept away from wall at least 50 cm. A space of about 1m should be kept clear in front of the UPS to provide room for both operation and maintenance.
3. The UPS is capable of continuous normal operation with in a temperature range of 0°C to 40°C (32°F to 104°F). For optimum performance and reliability to prolong UPS lifetime, the temperature should be kept below 25°C environment, and humidity must be maintained within a range of 0 to 95% (non-condensing).

For decreasing the dangerous due to accident, following rules should be observed.

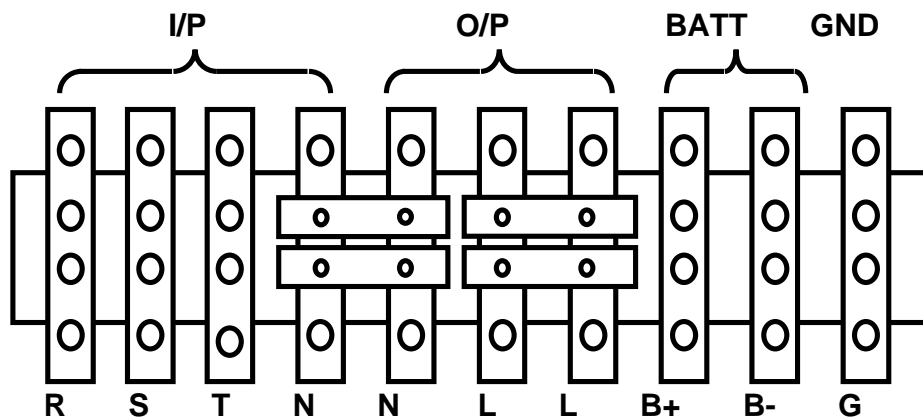
1. Walls, ceiling, floors as well as everything surrounding or near the UPS should be preferably constructed of noncombustible materials. The room should be equipped with a portable fire extinguisher.
2. Litter or trash of any sort should not be allowed to accumulate in or around the UPS system. The floor area surrounding the UPS should be kept clean so that metallic powder and filings are not sucked into the unit thus causing a short circuit and damage to the system.
3. Access to the UPS room should be limited to a minimum number of operation and maintenance personnel only. The doors should be kept locked and the keys should be controlled to authorized personnel only.
4. All personnel who operate or maintain the UPS system should be proficient in normal and emergency operational procedures. New personnel should be trained and tested prior to operating the equipment.

2.2 Electrical Connections

1. Terminals of 3 phase input Y connection / 3 phase output Y connection



2. Terminals of 3 phase input Y connection / single phase output



**** Connection of extra reserve AC power source:**

Please take off wires on AC input terminals that connect to reserve input circuit breaker, and connect the reserve AC power source to reserve input circuit breaker.

3. UPS systematic circuit breakers are aligned from left to right by the following order:
 - (1) AC input circuit breaker
 - (2) Rectifier input circuit breaker
 - (3) Reserve input circuit breaker
 - (4) UPS output circuit breaker
 - (5) Manual bypass circuit breaker

Note: In some UPS unit, the AC input circuit breaker is not installed depending on the input voltage type.

4. Following is the table correlating UPS rating capacity to input power requirements, output cables and battery cables. If the wire length is too long and cause the voltage drop too large, please according to the allowable voltage drop to chose adequate wire cables.

RATED VA	I/P VOLTAGE (V)	O/P VOLTAGE (V)	I/P C.B. (A)	I/P CABLE (mm ²)	RES C.B. (A)	RES CABLE (mm ²)	O/P C.B. (A)	O/P CABLE (mm ²)	BAT. CABLE (mm ²)	BAT. FUSE (A)
10K	120/208	120/208	50	14	40	14	40	14	14	30
	127/220	127/220	40							
	220/380	220/380	40		20	8	20	8		
	230/400	230/400								
	240/415	240/415								
15K	120/208	120/208	75	22	50	14	50	14	22	50
	127/220	127/220								
	220/380	220/380	40	14	30	8	30	8		
	230/400	230/400								
	240/415	240/415								
20K	120/208	120/208	100	22	75	22	75	22	22	60
	127/220	127/220	75							
	220/380	220/380	50	14	40	14	40	14		
	230/400	230/400	40							
	240/415	240/415								
30K	120/208	120/208	125	30	100	30	100	30	30	100
	127/220	127/220								
	220/380	220/380	75	22	75	22	75	22		
	230/400	230/400								
	240/415	240/415								
40K	120/208	120/208	175	50	150	50	150	50	38	120
	127/220	127/220	150	38						
	220/380	220/380	100	22	75	22	75	22		
	230/400	230/400								
	240/415	240/415								
50K	120/208	120/208	225	80	175	60	175	60	50	160
	127/220	127/220	200	60						
	220/380	220/380	125	30	100	30	100	30		
	230/400	230/400								
	240/415	240/415								

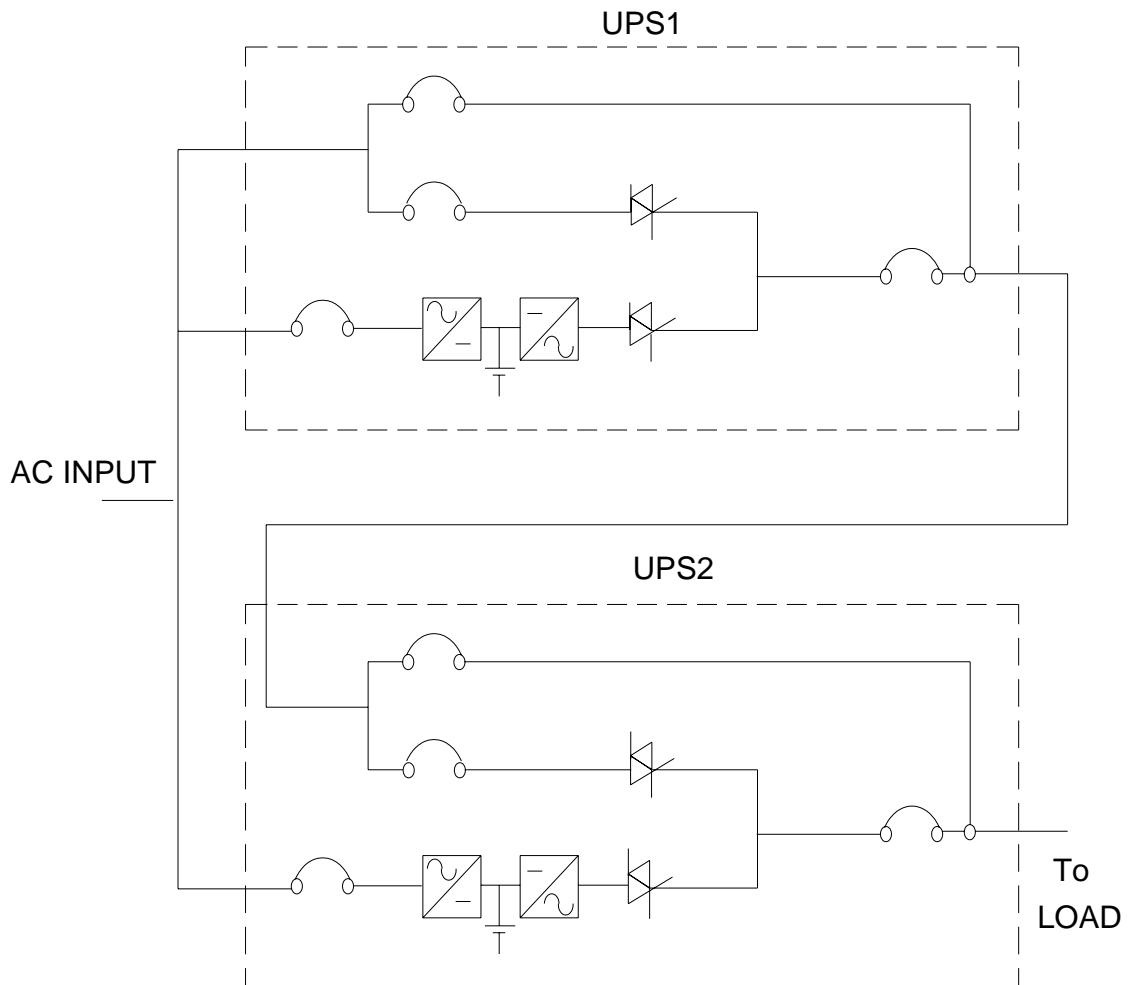
RATED VA	I/P VOLTAGE (V)	O/P VOLTAGE (V)	I/P C.B. (A)	I/P CABLE (mm ²)	RES C.B. (A)	RES CABLE (mm ²)	O/P C.B. (A)	O/P CABLE (mm ²)	BAT. CABLE (mm ²)	BAT. FUSE (A)
60K	120/208	120/208	250	100	200	60	200	60	60	200
	127/220	127/220	225	80						
	220/380	220/380	150	38	125	38	125	38		
	230/400	230/400	125	30						
	240/415	240/415								
80K	120/208	120/208	350	150	300	125	300	125	80	250
	127/220	127/220	300	125						
	220/380	220/380	175	50	150	60	150	60		
	230/400	230/400								
	240/415	240/415								
100K	120/208	120/208	500	250	350	150	350	150	100	300
	127/220	127/220	400	200						
	220/380	220/380	225	80	200	80	200	80		
	230/400	230/400								
	240/415	240/415								
120K	120/208	120/208	500	250	400	200	400	200	125	350
	127/220	127/220								
	220/380	220/380	300	125	225	100	225	100		
	230/400	230/400	250	80						
	240/415	240/415								
150K	120/208	120/208	700	400	500	250	500	250	200	450
	127/220	127/220	600	325						
	220/380	220/380	350	150	300	125	300	125		
	230/400	230/400								
	240/415	240/415								
160K	120/208	120/208	700	400	600	250	600	250	200	500
	127/220	127/220	600	325						
	220/380	220/380	350	150	300	125	300	125		
	230/400	230/400								
	240/415	240/415								

Note: Output neutral cable should double the size of phase cable for non-linear load.

2.3 Check UPS and Battery Cabinet

The UPS system had been carefully checked both electrical and mechanical characteristics in detail prior to shipment from the factory. The system should be in proper conditions upon receipt. A thorough visual/mechanical inspection of the system should be performed to determine if any physical damage was caused during transit. Confirm all plug-connectors are properly.

2.4 Isolated Redundancy Wiring



The advantages of isolated redundancy wiring:

1. Higher reliability than single module.
2. Higher fault clearance capability than single module when main power failure.
3. 100% UPS cover during maintenance intervals.
4. Life time of both UPS is increased.

3. Operation

3.1 Parameter Settings

Boost charge time: Use dip switch SWA1-5 & SWA1-6 on A PCB behind the UPS front door to adjust boost charge time. The preset values of boost time is 1 hour. Following is the time table.

SW1-5	SW1-6	BOOST TIME
OFF	OFF	1 HOUR
OFF	ON	2 HOURS
ON	OFF	4 HOURS
ON	ON	8 HOURS

Boost charge reset: Press SWA4 on A PCB behind the UPS front door to clear boost charge function.

3.2 System Start-up procedure

Please check the following noticed items before UPS start-up:

1. All circuit breakers and isolators are in off position and battery fuse is out.
2. Ensure that neutral line and grounding are the same voltage level.
3. Apply power to the AC input cables and check that input voltage, frequency and phase order are with in the machine specifications.

When UPS comply with the above mentioned conditions, start-up UPS according to the following procedure:

1. Close " MANUAL BYPASS " breaker, at the same time LCD display " LOAD ON BYPASS ".
2. Close " AC INPUT " and " RECTIFIER INPUT " breaker , wait 15~20 seconds until " BATT LOW " LED behind the door is off.
3. Close " RESERVED INPUT " breaker, at the same time LCD display " LOAD ON RESERVE ".
4. Close " UPS OUTPUT " breaker.
5. OPEN " MANUAL BYPASS " breaker.
6. Close " BATTERY FUSE ISOLATOR " in battery cabinet.
7. Press the inverter "ON" & "↔" button simultaneously, the load will be transferred from reserve to inverter automatically, at the same time LCD display " LOAD ON INVERTER ".

Note: It must never turn on “manual bypass” circuit breaker when the inverter is turned on. It will damage the UPS owing to utility power parallel with inverter output.

3.3 Maintenance Manual Bypass Procedure

This procedure leaves the critical load undisturbed and the UPS batteries still being charged.

1. Check “ MAIN FREQ ABNORMAL ” “ RES MAIN FAIL ” LEDS behind the door are all off.
2. Press inverter “ OFF ” & “ ⇔ ” button simultaneously. Check that “ INV ON ” LED behind the door is off.
3. Close “ MANUAL BYPASS ” breaker.
4. OPEN “ UPS OUTPUT ” breaker.
5. OPEN “ RESERVE INPUT ” breaker.

3.4 Return from Bypass to Normal Mode

This operating procedure will transfer load from bypass to normal mode as follows:

1. Check that “ INV ON ” LED behind the door is off.
2. Close “ RESERVE INPUT ” breaker.
3. Close “ UPS OUTPUT ” breaker.
4. Open “ MANUAL BYPASS ” breaker.
5. Press the inverter “ ON ” & “ ⇔ ” button simultaneously.
6. The load will be transferred from reserve to inverter automatically.

3.5 System Shutdown Procedure

This operating procedure can turn off power supply to UPS, please first confirm the load has been shutdown, the procedures as follows :

1. Press inverter “OFF” & “⇔” button simultaneously , Check that “INV ON ”LED behind the door is off.
2. Close “ MANUAL BYPASS ” breaker.
3. Open “ BATTERY FUSE ISOLATOR ” in battery cabinet.
4. Open “ RECTIFIER INPUT ” breaker.
5. Open “ RESERVE INPUT ” breaker.
6. Open “ UPS OUTPUT ” breaker.
7. Wait 5 mins for DC CAP to discharge.
8. Open “ AC INPUT ” & “ MANUAL BYPASS ” breaker.

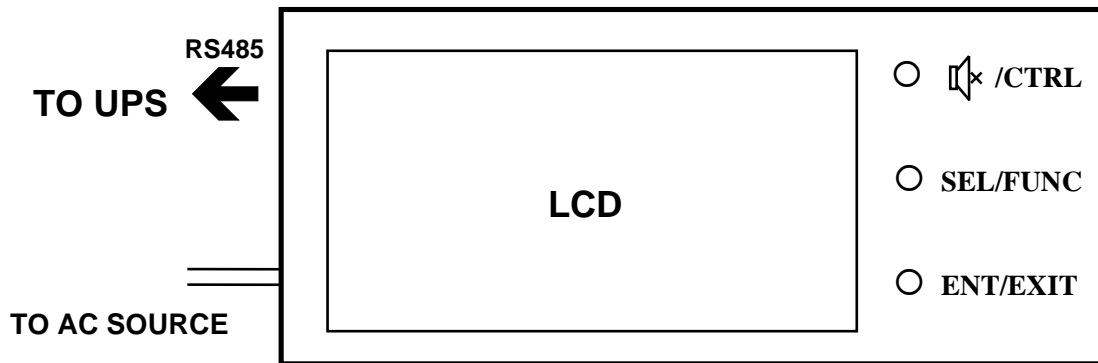
4. Maintenance

To increase system reliability, please according to the following notice do the cyclical maintenance:

1. Blowers or fans, mounted in the top of the system, should be checked for proper operation at monthly intervals. Improper blower operation can cause a rise in system operating temperature resulting in an over temperature shutdown.
2. Cable connections to circuit breakers and other terminals should be checked for discoloration produced by overheating also at monthly intervals.
3. Every 6 Months a qualified service engineer should check the machines electronic settings and take any appropriate action to ensure the long term reliability of the UPS.

5. Options

5.1 Remote Monitoring



When the remote monitor communicates with the UPS, you can see not only more than one UPS test data and status, but also can set inverter and alarm ON / OFF. LCD display is the same as UPS synchronously, but with more three keys.

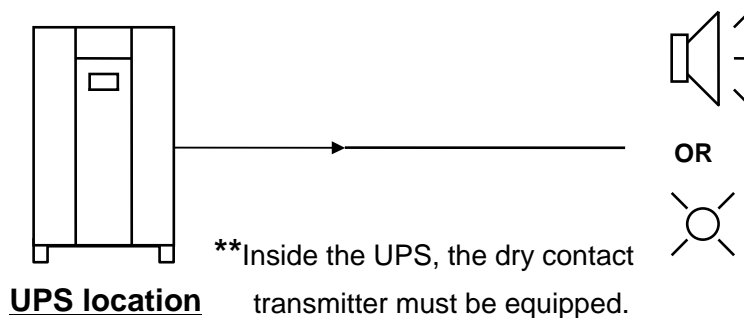
Silence/Control (CTRL) key: When UPS status is abnormal, pressing this key will turn off alarm.

Select/Function (FUNC) key: Press for selecting control item.

Enter/Exit (EXIT) key: Press for entering or setting on communication.

You can monitor and control three sets of UPS by using only one remote monitor.

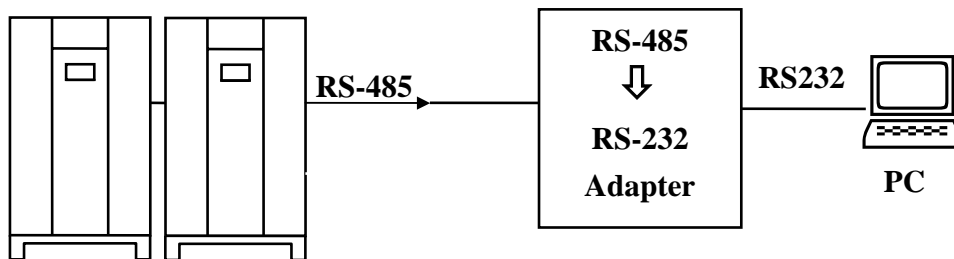
5.2 Dry Contact



The user can use four sets dry contact for indicating status or driving the alarm device, which are synchronized with four LEDs located on the left side of the front panel. Their statuses are described as follows:

1. **INV (load on inverter):** The inverter is in operating condition.
2. **RES (load on reserve AC source):** The load is supplied by reserve AC source.
3. **WARNING:** Indicate the rectifier input voltage abnormal, battery low stop, reserve AC source abnormal, battery low, battery ground fault, or inverter overload.
4. **FAULT:** Indicate the rectifier high dc voltage, over temperature / fuse failure, or inverter short circuit.

5.3 Monitoring software



If the exclusive software---UPSentry for GES T-series is installed, you can monitor 31 sets UPS status at the same time on one PC with inverter/horns remote control, password setting, automatic detection and warning, malfunction data statistics, real time monitoring (input / output voltage, current and frequency etc.), and file transmission.

5.4 Custom- Mode Accommodation

According to the customer's wiring system, we can design the different input / output voltage specifications to meet the customer's demand.