

# UPS System

## 1. UPS

UPS Battery, Converter, Inverter, Static Switch,  
Maintenance Bypass Switch 5 가 .

### Battery

AC Inverter DC .

### Converter

AC DC , Battery Inverter DC  
, Rectifier / Charger .

### Inverter

Converter Battery DC ,  
AC / ,  
Filter .

### Static Switch

Inverter Trouble , 가 .

### Maintenance Bypass Switch

UPS Trouble , .

## 2. UPS

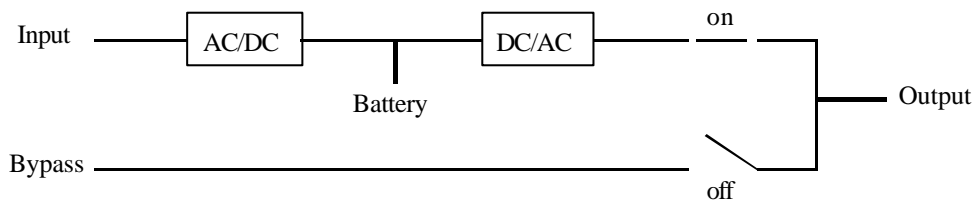
### 1) UPS

UPS 100W / KVA ,

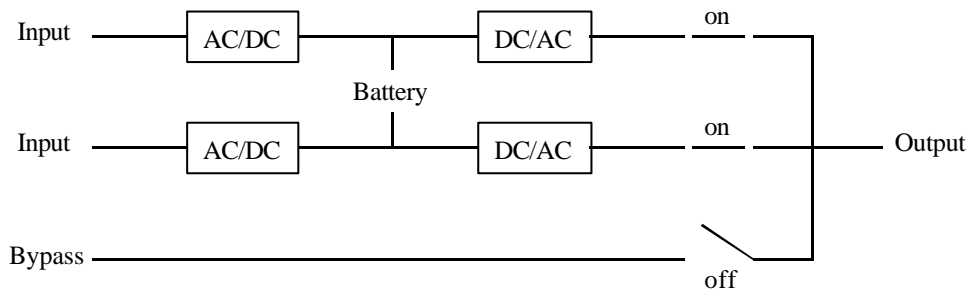
UPS : 10KVA  
 UPS : 10KVA      100KVA  
 UPS : 100KVA

**2) System                      UPS**

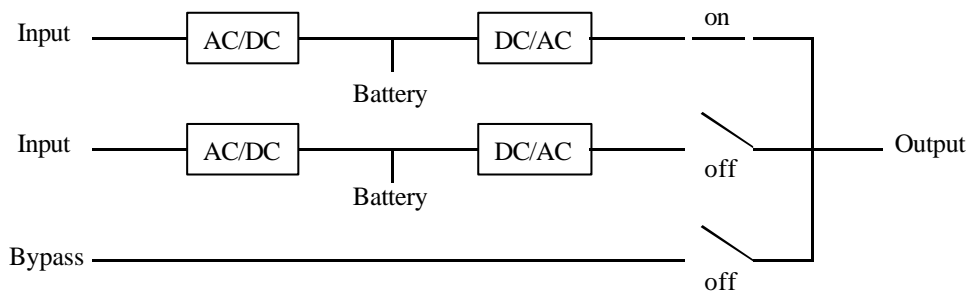
Single UPS



Parallel UPS



Hot Standby UPS



2-1. System

UPS

UPS System 1 UPS  
 Single System 2 UPS Dual System  
 . ( 2-1. )  
 Dual System Static Switch Parallel System, Hot  
 Stand-by System , 2-1

2-1. Parallel System Hot Stand-by System

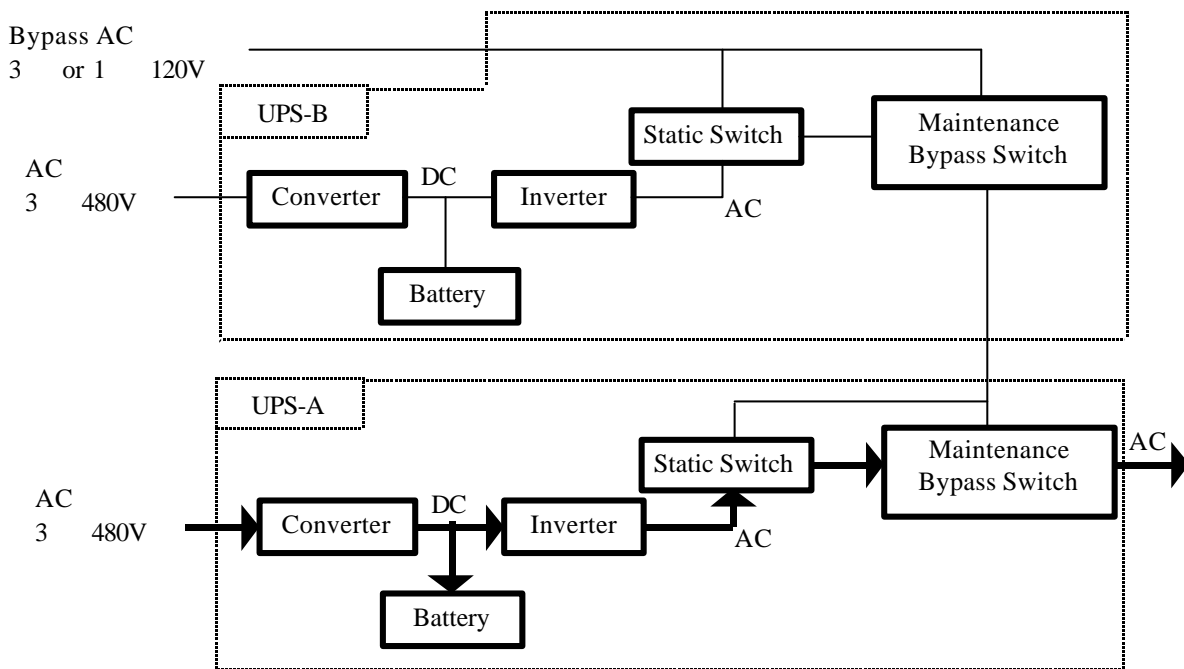
	Parallel System	Hot Stand-by System
System /	2 UPS 가 Common , 1 가 1 가 6 Parallel 가 .	1 UPS 가 , 1 Bypass UPS UPS 가
	2 UPS 가 1 가 .	1 Stand-by UPS Bypass .
UPS	50% 100% 가 (2 UPS 가 )	0% 100% 가
UPS	UPS UPS , UPS 가	Hot Stand-by UPS 가 .

### 3. UPS System Operation

Hot Stand-by Operation      Dual UPS System

1)

UPS Inverter Switch, Converter AC, DC, 3 480V AC, Static Switch, Battery, Inverter, Maintenance Bypass

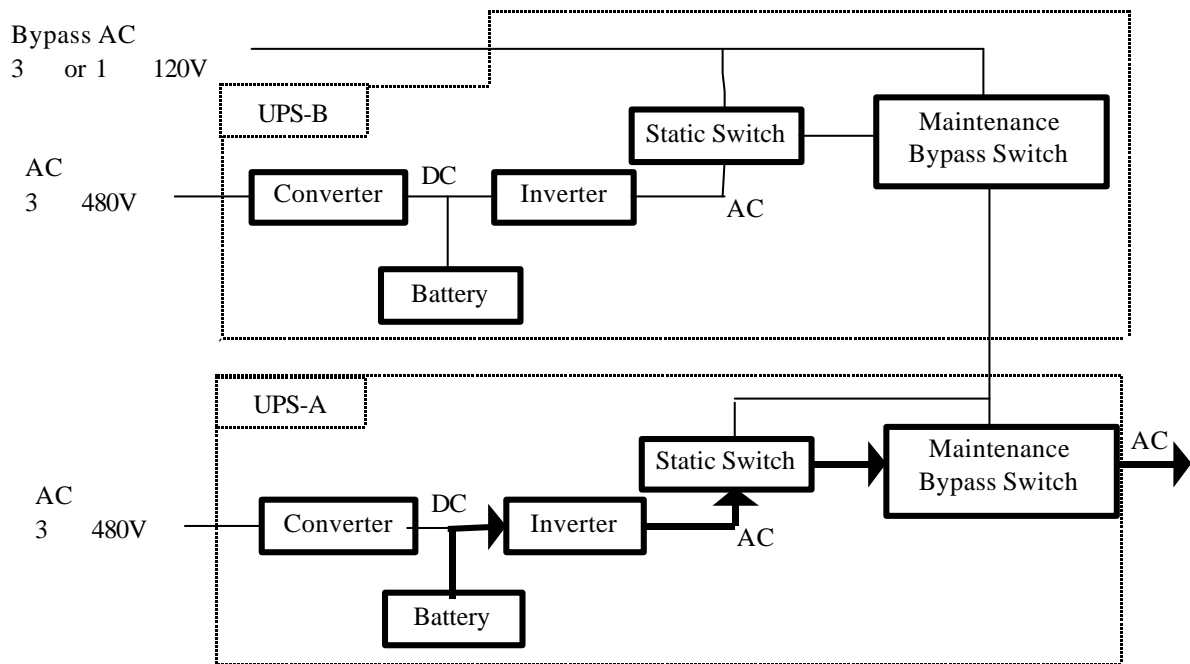


UPS-A      UPS-B      Maintenance Bypass Switch  
 , UPS-B      UPS-A

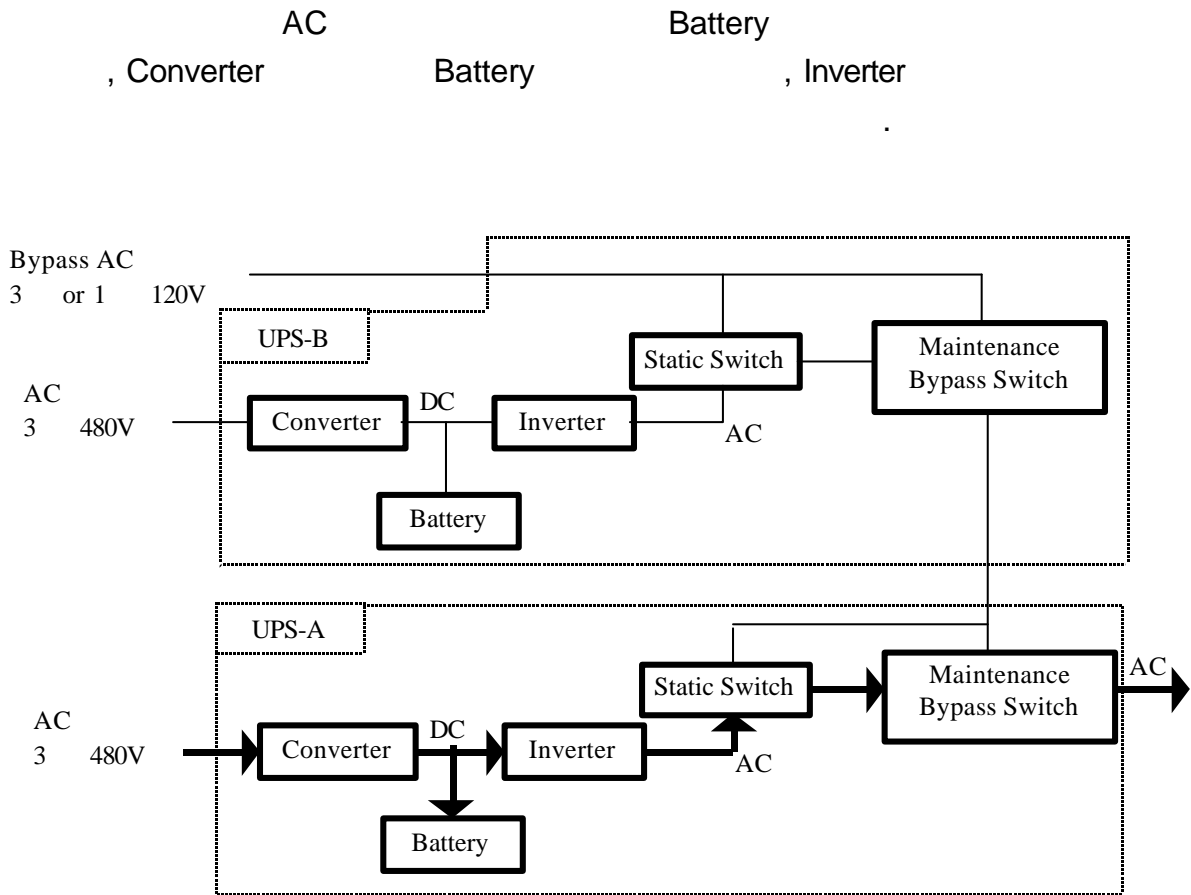
UPS-B AC UPS-A Bypass  
 UPS-A Static Switch Maintenance Bypass Switch UPS-A  
 “Hot Stand-by”  
 UPS System “Hot Stand-by System”

2) AC

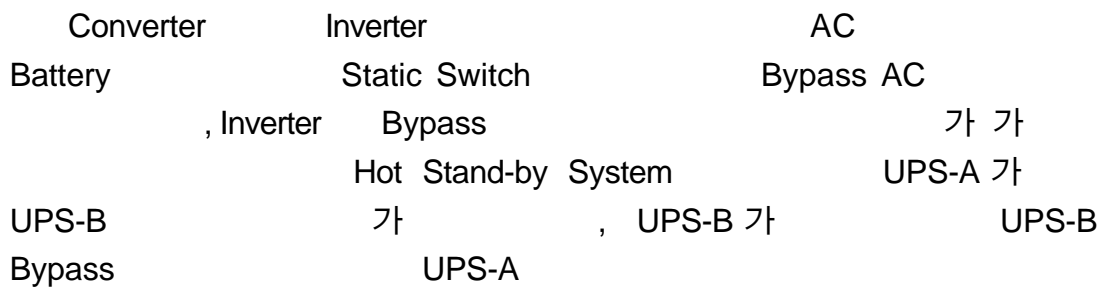
Converter AC  
 Inverter Battery (UPS  
 30 가 ) Battery  
 Hot Stand-by UPS-B  
 UPS-B Battery 가 Inverter 가

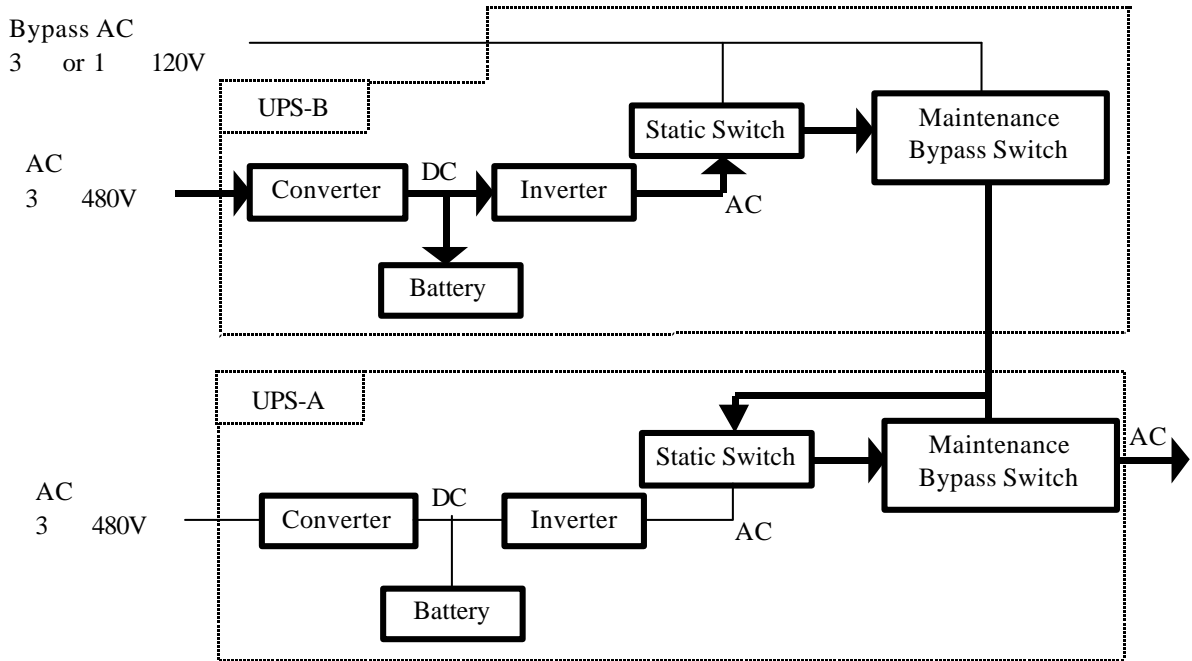


### 3) AC



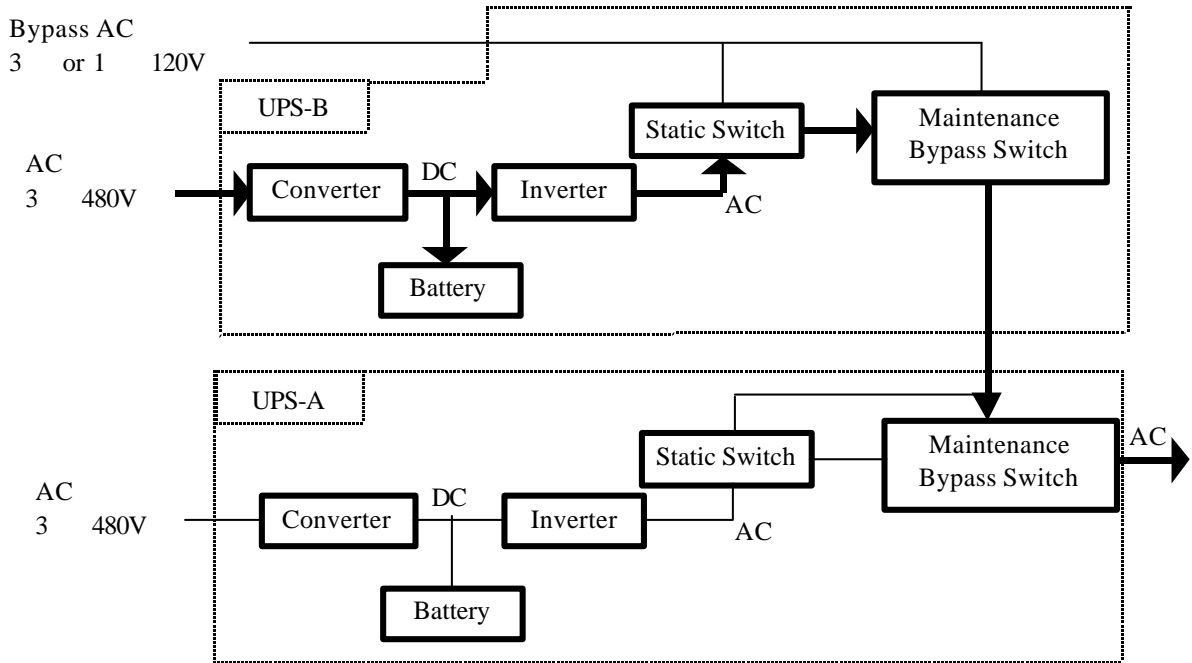
### 4) Bypass





### 5) Maintenance Bypass

UPS Maintenance Bypass Switch  
Maintenance Bypass Switch  
Bypass AC  
Hot Stand-by System UPS-A UPS-B  
Maintenance Bypass Switch가 UPS-A  
Maintenance Bypass UPS-B Single System  
, UPS-B Maintenance Bypass UPS-A  
가 Single System 가 .  
, Maintenance Bypass Switch UPS Static  
Switch Bypass , Static Switch가 Inverter  
가  
가 S/D .



4.

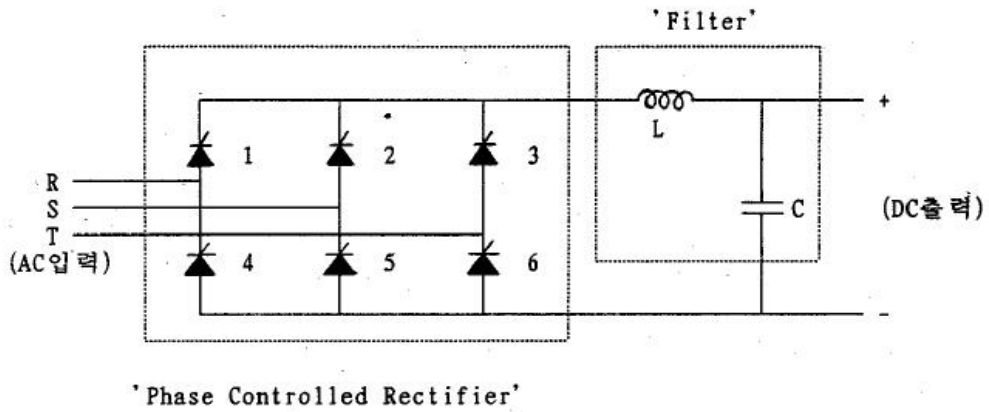
1) Converter (Rectifier/Charger)

Converter 3 AC DC , 6  
 SCR 3 SCR 3 Diode , ' Phase  
 Controller' , ' DC Regulator' Control PCB Control . ( 4-1 )  
 DC 4-2 SCR Gate Firing  
 . 3 AC 480V 가 Converter  
 DC 135V, DC 230V, DC 405V, DC540V .  
 AC DC 4-3 Ripple  
 DC Filter 가 .( 4-1 )  
 Converter , SCR 3 Power  
 Fuse 가 , Cable 3 AC

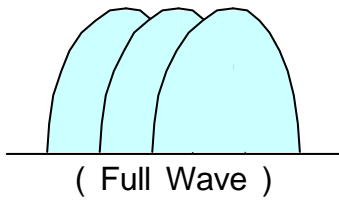


Converter System  
Converter

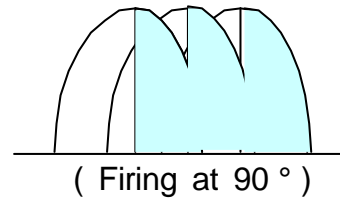
가



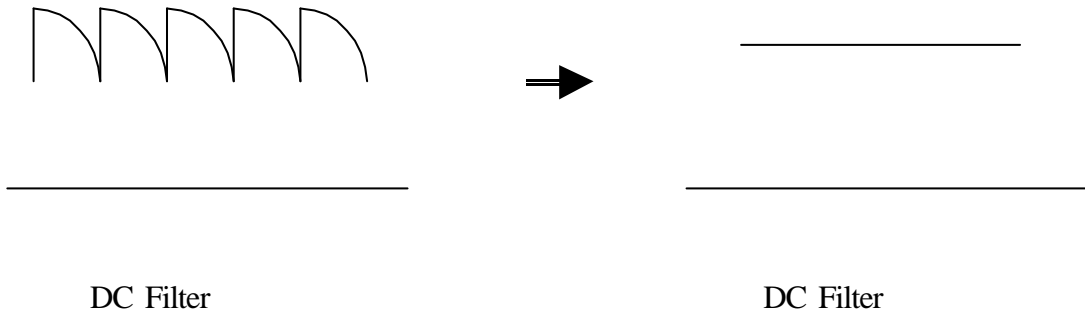
4-1. Converter Circuit



4-2. SCR Gate Firing



Converter



4-3. DC Filter

• Converter

AC

DC

가.

4-4

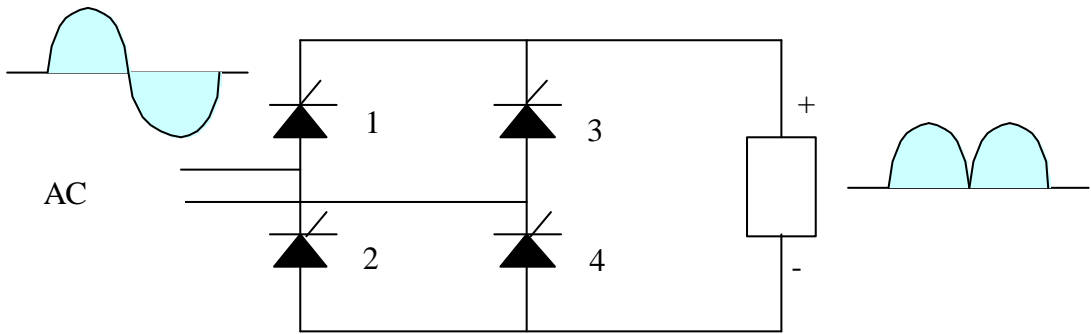
±

가

(SCR)

+

가



4-4.

· : +

+

SCR 1,4

On

SCR 2,3

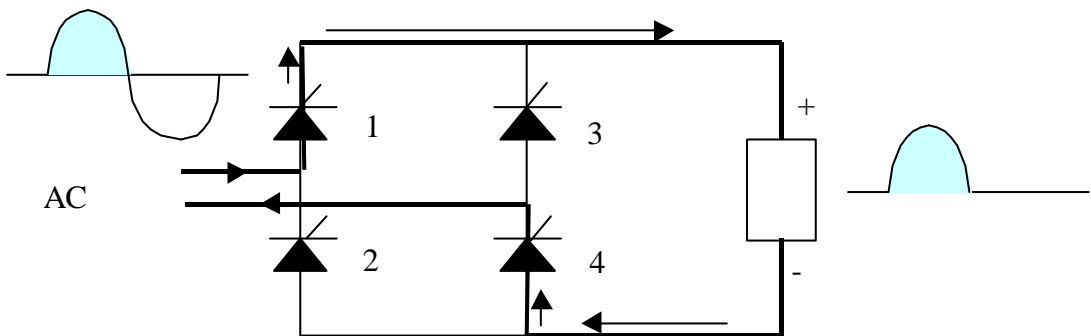
Off

+

4-5

SCR 1,4

가

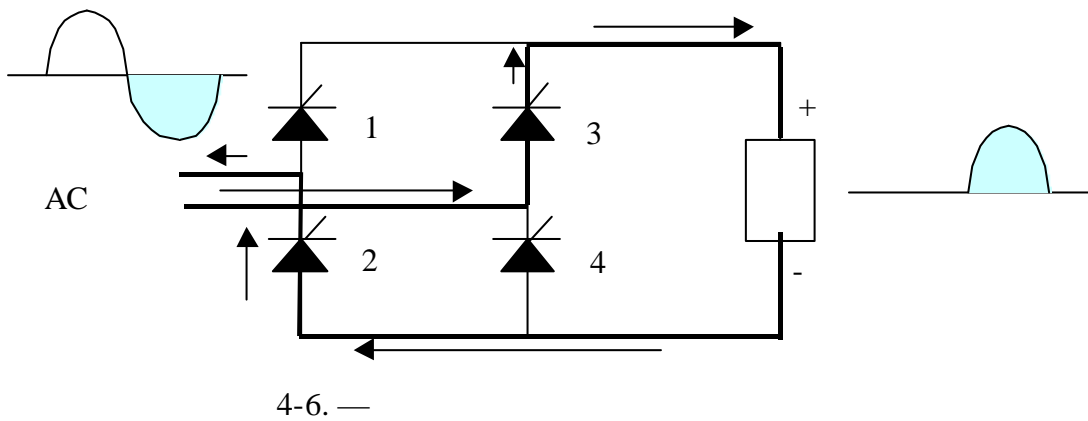


4-5. +

:-  
 Off , 4-6 가 .  
 +  
 SCR 2,3 On , SCR 1,4  
 SCR 3,2

## 2) Battery

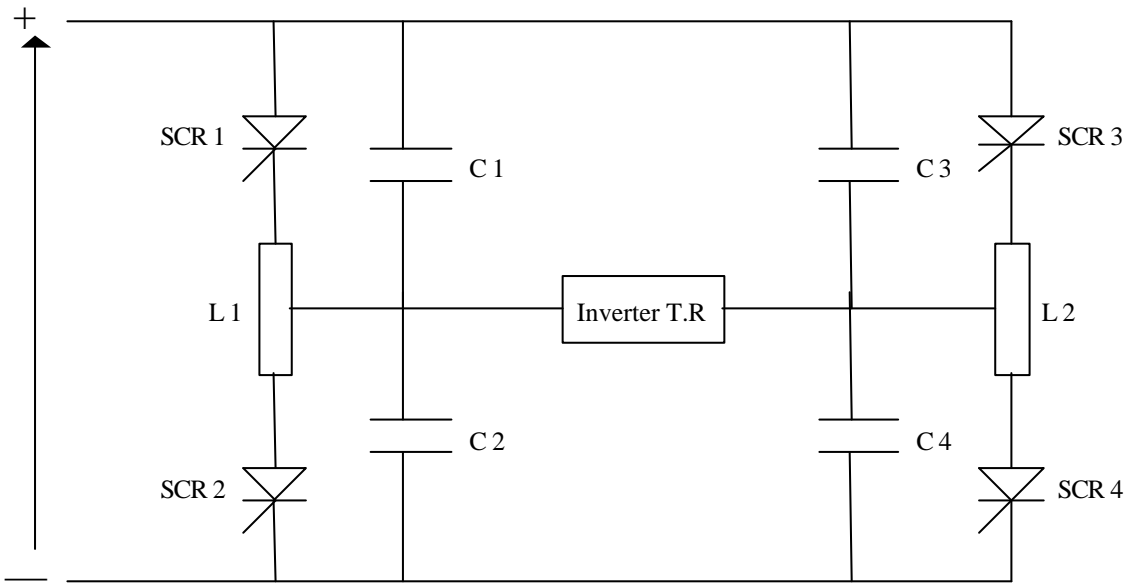
가 Trouble  
 UPS 30 Back-up 가 UPS  
 Battery AH 가 , DC .  
 Battery Battery, Battery  
 Battery



## 3) Inverter

DC / AC  
 , SCR, Transistor, IGBT(Insulated  
 Gate Bipolar Transistor), GTO(Gate Turn Off SCR)  
 System , 4 ,  
 Inverter 3 AC , 12 가 .( 4-7  
 )

, Inverter  
 , 3 120  
 Control PCB 가  
 SCR Off ( )  
 L C Commutation Circuit(轉流回路) 가 가



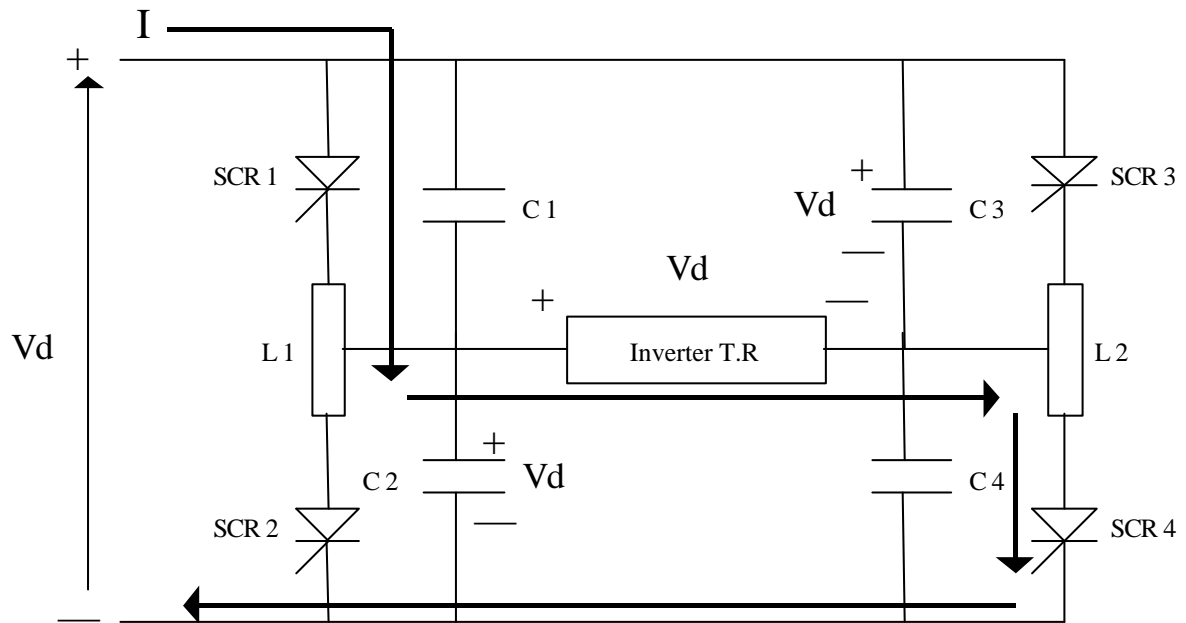
4-7. 1 Inverter

SCR Inverter

가. SCR 1 On, SCR 2 Off, SCR 3 Off, SCR 4 On

SCR 1,4 On , 4-8 (a)  
 Inverter T.R. +Vd 가 Inverter 4-8 (b)

, Capacitor C2, C3 Vd  
 , SCR 2 On , Capacitor C2 4-9 (a)  
 , Choke L1 Capacitor C2 Vd 가 가  
 SCR 1 Cathode 2Vd 가



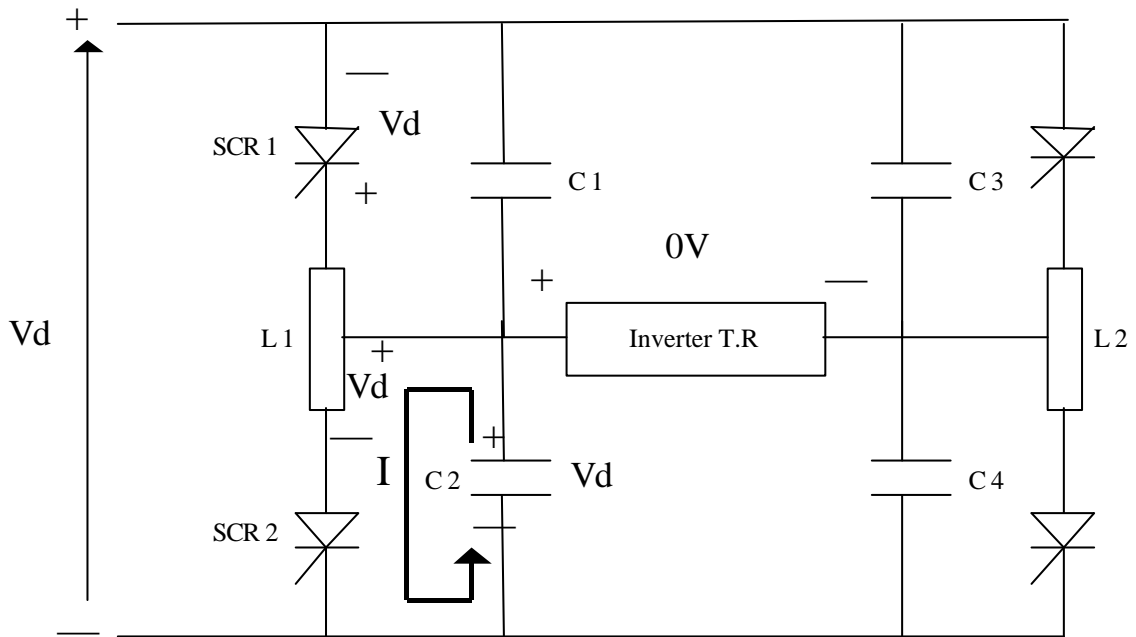
(a)



(b)

4-8. SCR 1,4 On 1 Inverter

T.R. , SCR 4 , SCR 1 , Vd Off , Inverter  
 Mechanism Off ,  
 0V 가 가 .



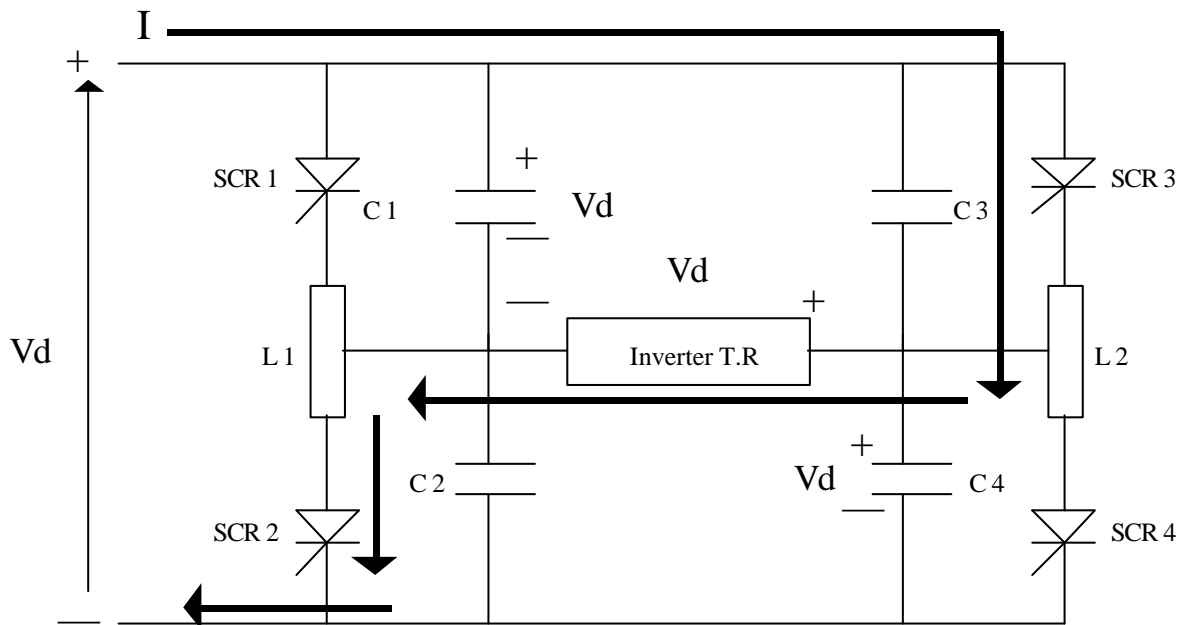
(a)



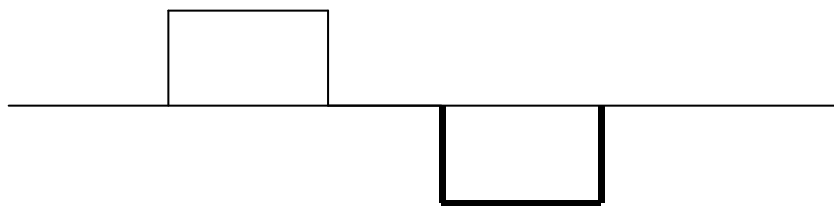
(b)

4-9. SCR 1 Off Mechanism SCR 1,4 Off

. SCR 1 Off, SCR 2 On, SCR 3 On, SCR 4 Off  
 SCR 2,3 On , 4-10 (a)  
 , Inverter T.R. - Vd 가 Inverter 4-10  
 (b) . , Capacitor C2, C3 Vd .  
 , SCR 4 On , Capacitor C4 4-11 (a)  
 , Choke L2 Capacitor C4 Vd 가 가  
 SCR 3 Cathode 2Vd 가 . , SCR 3  
 Vd Off . SCR 2 ,  
 Mechanism Off , Inverter T.R. 4-11 (b)  
 0V 가 가 .



(a)

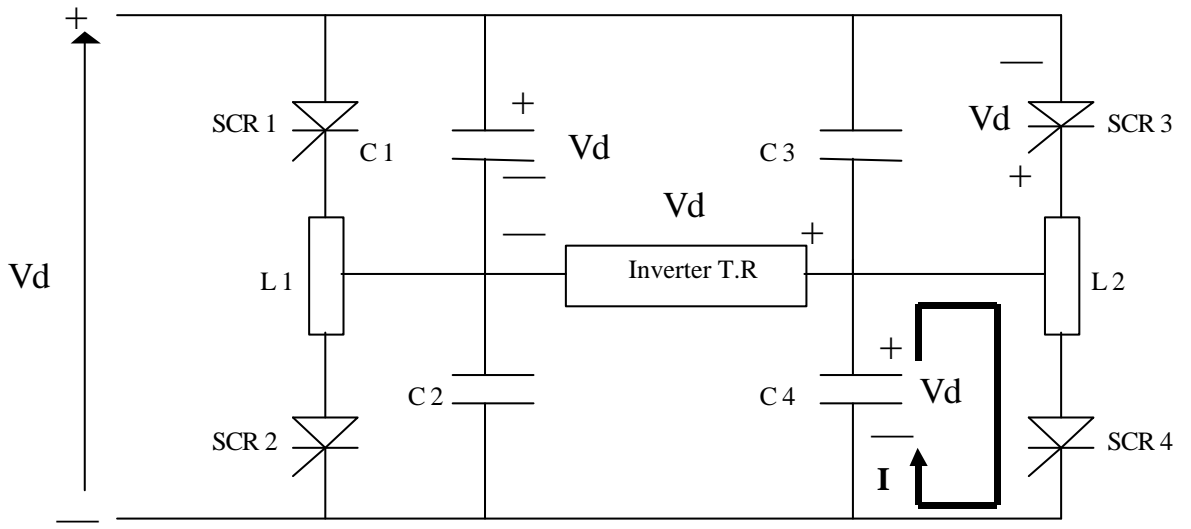


(b)

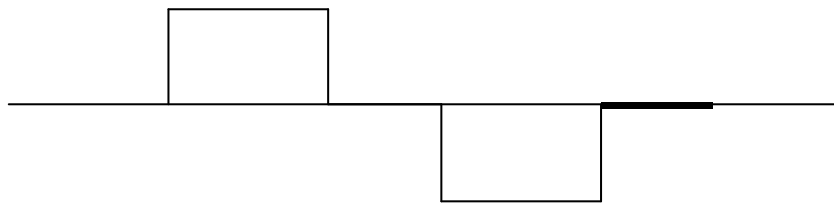
4-10. SCR 2,3 On 1 Inverter

#### 4) Output Filter

Inverter AC  
 Inverter Filter  
 , Inverter 3, 5, 7 가  
 , 3 Inverter T.R Zig-zag ,  
 Inverter PWM (Pulse Width Modulation) 5, 7  
 L - C Filter 가  
 4-12 5, 7 Output Filter

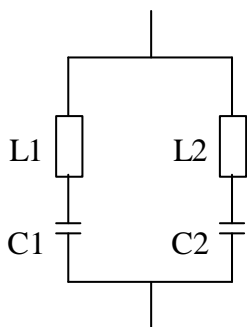


(a)



(b)

4-11. SCR 3 Off Mechanism      SCR 2,3 Off



L1, C1 : 5

L2, C2 : 7

$$F_o = \frac{1}{2\pi\sqrt{LC}}$$

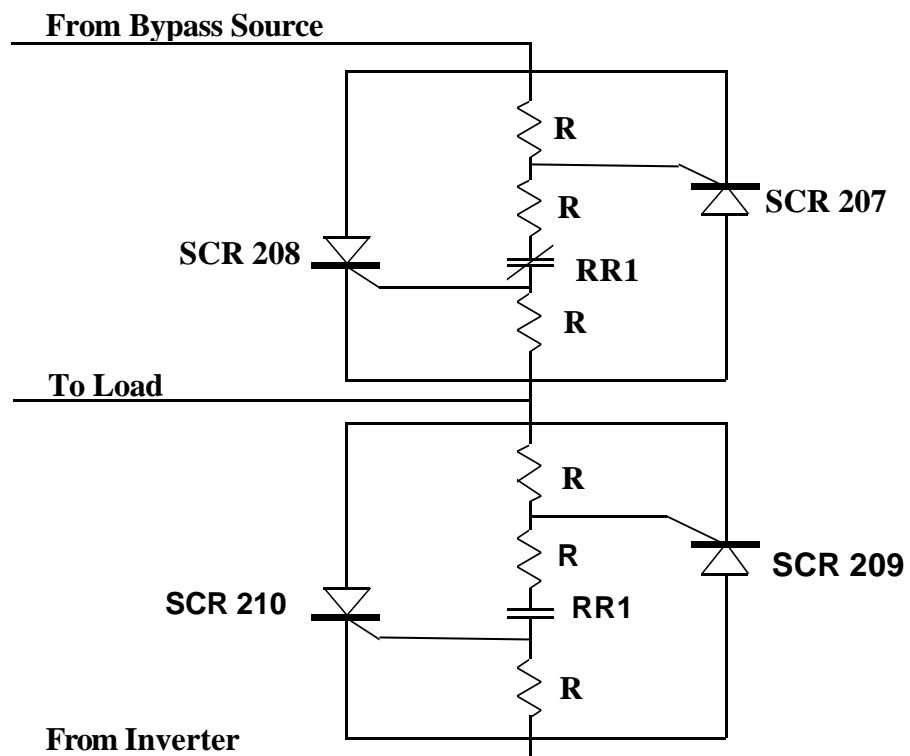
4-12. Output Filter



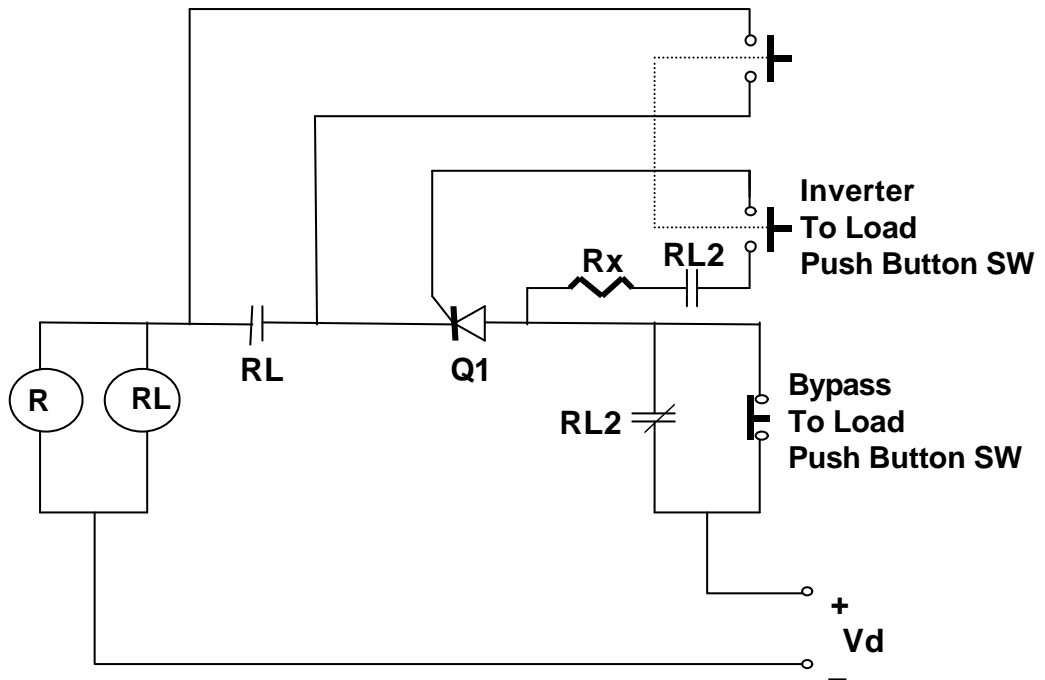
## 5) Static Switch

Inverter Trouble /  
 SCR Type , SCR - Magnetic Contactor , SCR -  
 Circuit Breaker , Control PCB .  
 Complex SCR Type  
 1 UPS SCR Type Static Switch 4-13 (a)

4-13 (b) Static Switch Control Circuit  
 RL2 Inverter Bypass  
 , RL2 가 가 , Bypass  
 To Load Push Button Switch , RR1 Off ,  
 4-13 (a) SCR207, SCR 208 On Bypass



(a) Static Switch Circuit



**Remark**  
 RL2 : Inverter                      Bypass  
 RL1, RR1 :

(b) Static Switch Control Circuit For Manual Transfer

4-13.1    UPS    Static Switch Circuit

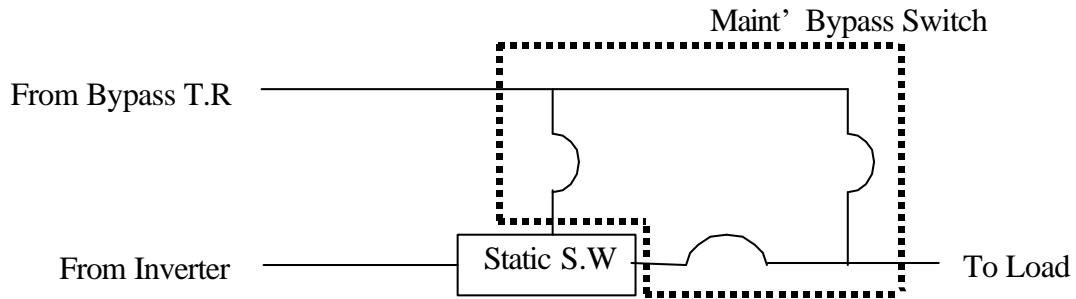
, Inverter To Load Push Button Switch                      4-13 (b)  
 SCR Q1    On                      RL1, RR1    On    , RR1  
 4-13 (a)    SCR 209, SCR 210    On    ,    Inverter  
 ,                      RL2 Relay 가 Off                      가  
    Off                      SCR

## 6) Maintenance Bypass Switch

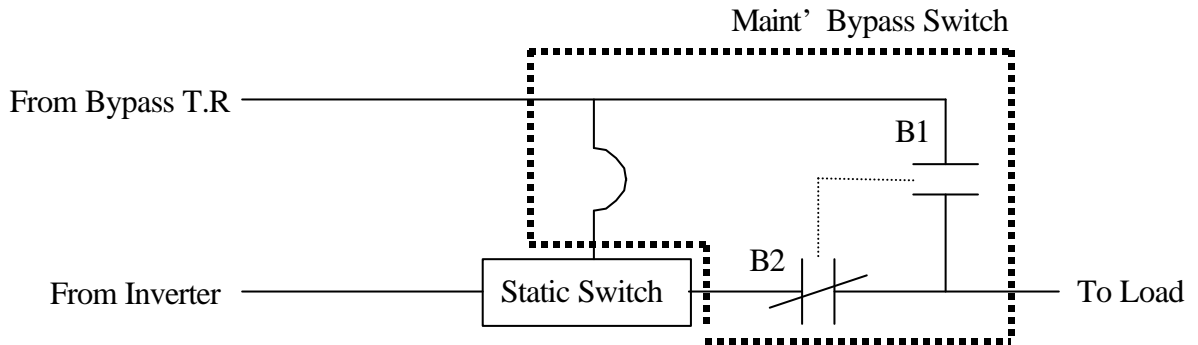
UPS Trouble

Circuit Breaker Type , 3 Position Switch Type , Circuit Breaker – 2 Position Switch

3 가 Type Maintenance Bypass Switch  
4-14 ~ 4-16

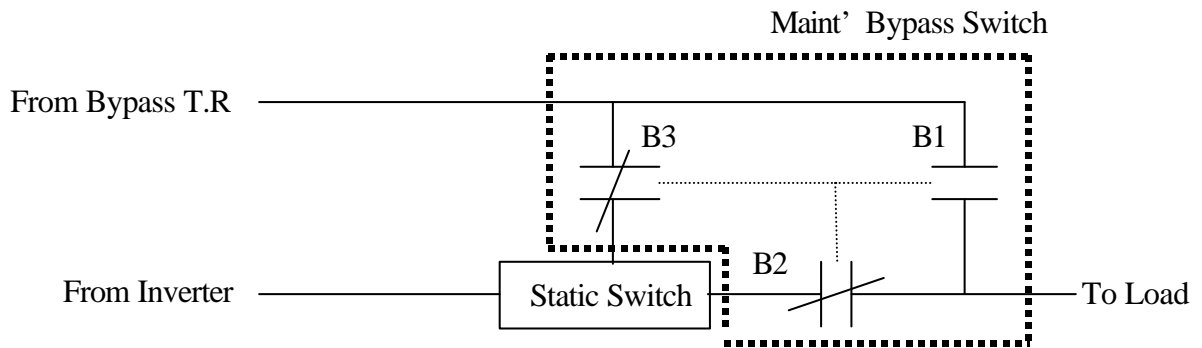


4-14. Circuit Breaker Type Maintenance Bypass Switch



Switch Position	Maint' Bypass Switch Contacts	
	B1	B2
Normal		
Bypass		

4-15. Circuit Breaker - 2 Position Switch Type Maintenance Bypass Switch



Switch Position	Maint' Bypass Switch Contacts		
	B1	B2	B3
Normal	/ \	/ \	/ \
Bypass	\ /	\ /	\ /
Bypass Isolate	\ /		

4-16. 3 Position Switch Type Maintenance Bypass Switch