



VERTIV™

Liebert®

UTILITYSURE

INDUSTRIAL MODULAR RECTIFIER
BATTERY CHARGER





UtilitySure™ is a reliable industrial modular rectifier battery charger with state-of-the-art technology.

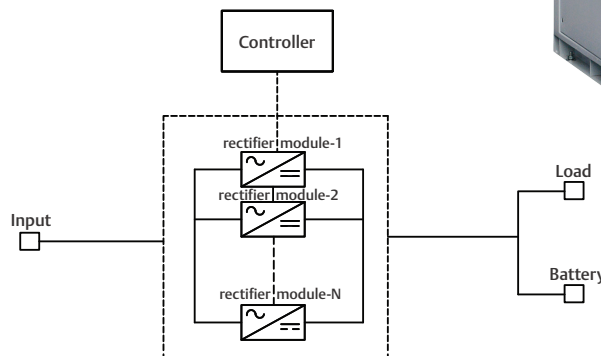
UtilitySure™ is designed to meet the most demanding specifications of industrial requirements. UtilitySure™ product includes a wide choice of ratings and operator friendly features.

Available in 24, 48, 110 & 220 nominal voltages.



Benefits

- **Highest availability of power:**
 - Hot-swappable modules to reduce the MTTR (Mean Time to Repair).
 - MTBF (Mean time between failures) > 2,50,000 hrs.
 - Various redundancy levels - N+1 (or) N+2 (or) N+N to improve load continuity.
- **Monitoring:**
 - State-of-the-art Individual DC feeder earth leakage monitoring.
 - Battery Monitoring System (BMS).
 - Each Feeder status monitoring (On/off/trip).
- **High electrical performances:**
 - Wide input voltage tolerance to comply with the worst utility conditions.
 - Near Unity input power factor, low THDi rejection and low in rush current to save installation and operation costs.
 - High efficiency to lower power consumption.
- **Industrial flexibility:**
 - Suitable for all battery types (Lead Acid or Nickel-Cadmium or Plante).
 - Scalability to meet the evolving load changes.



BLOCK DIAGRAM OF A MODULAR DC UPS (FCBC)

Key Features

- Large and colour LCD (touch-pad user interface - optional with EMU10 controller)
- USB port to import / export system configuration (optional with EMU10 controller)
- Low voltage ripple to optimize battery life
- In-built galvanic isolation (inside rectifier modules)
- Ingress protection up to IP 55
- Suits all weather conditions: works from - 40° C to 70° C

Applications

- UtilitySure™ suits all DC UPS applications where modular design concept is key for maintenance with highest uptime. It is best suitable for all critical applications such as:
- Power generation
 - Oil & gas
 - Rail transportation infrastructures
 - Power transmission and distribution substations
 - Other industries

DETAILS OF RECTIFIER MODULES :

We have the following ratings of rectifier modules:

24V	48V	110V	220V
75A, 1Ph (ER2475S) /	30A, 1Ph (ER4830S)	10A, 1Ph (ER11010S)	5A, 1Ph (ER22005S)
75A, 1Ph (R24-2200)	50A, 1Ph (ER4850S)	20A, 3Ph (ER11020T) 1	0A, 3Ph (ER22010T)
	-	40A, 3Ph (ER11040T)	20A, 3Ph (ER22020T)

The details of each rectifier module are as follows:

Parameter	1-Phase Modules				3-Phase Modules			
	ER22005S	ER11010S	ER4850S	ER2475S / R24-2200	ER22020T	ER22010T	ER11040T	ER11020T
AC Input Voltage (V)	85-286 (Single Phase)		85-290 (Single Phase)		305-530V (3 Phase, 3 Wire)	323-475V (3 Phase, 3 Wire)	305-530V (3 Phase, 3 Wire)	323-475V (3 Phase, 3 Wire)
AC input frequency	45 - 65				45 - 65			
AC input current (A)	<4	<4	<10	<10	<15	<10	<15	<10
Efficiency	≥91 %	≥91 %	≥90.5 %	≥90%	≥92.5%	≥92%	92 %	≥92 %
Power Factor	≥0.99	≥0.99	≥0.99	≥0.99	≥0.99	≥0.92	≥0.99	≥0.92
THD	≤5%	≤5%	≤5%	≤5%	≤5%	≤30%	≤5%	≤30%
DC Output Voltage Range(V)	176 - 286	88- 143	42 - 68	21 - 39	176 - 320	176 - 320	88-160	88-160
Rated Current (A)	5	10	50	75	20	10	40	20
Output Power (W)	1430	1430	2900	2175	5720	2860	5720	2860
Ripple Factor	<=0.1% RMS	<=0.1% RMS	≤0.1% RMS	≤0.5% RMS	≤0.1% RMS	≤0.1% RMS	≤0.1% RMS	≤0.1% RMS
Current Stabilizing Accuracy	≤±1.0 %	≤±1.0 %	≤±1.0 %	≤±1.0 %	≤±0.5 %	≤±0.5 %	≤±0.5%	≤±0.5%
Voltage Stabilizing Accuracy	≤±0.5 %	≤±0.5 %	≤±0.5 %	≤±0.7 %	≤±0.5 %	≤±0.5 %	≤±0.5 %	≤±0.5 %
CE & ROHS	CE CERTIFIED & ROHS COMPLIANT (R5)							
Noise (dB)	≤55	≤55	≤55	≤55	≤50	≤52	≤50	≤52
Dimension (mm)	145H	145H	132H	132H	244H	176H	244H	176H
	72W	72W	85W	85W	88W	88W	88W	88W
	280D	280D	287D	287D	380 D	315 D	380 D	315D
Weight (kg)	<3	<3	<3.5	<3.5	<10	<6	< 10	<6

STANDARD SPECIFICATIONS:

Following are the best specifications we can offer with 24V/48V/110V/220V DC UPS Systems :

AC INPUT	24 1/148V	1101/1220V		
Nominal Voltage	1 Phase : 200 VAC to 250V AC(Rated),Maximum: 290V AC ; Minimum: 85V AC (85V AC to 180V AC output power limiting) 3 Phase : By distributing the rectifier modules in each phase	1 Phase : 200 VAC to 250V AC, (Rated) Maximum: 286V AC ; Minimum: 85V AC (85V AC to 180V AC output power limiting) 3 Phase : 380VAC, 4W /3W (optional) Maximum: 530V AC ; Minimum: 260V AC (260V AC to 310V AC output power limiting)		
Frequency	45Hz to 65Hz	45Hz to 65Hz		
THDi	≤ 5 % at rated load	≤ 5 % at rated load		
Power Factor	≥ 0.99 at rated load	≥ 0.99 at rated load		
Slow Start Time	upto 8 seconds	upto 8 seconds		
DC OUTPUT	24V	48V	110V	220V
Voltage	21 — 39V DC	42-68V	88-160V	176-320V
Current	20% - 110% rated current			
Efficiency	≥ 90 %	≥ 90.5 %	≥ 92 %	≥ 92.5 %
Ripple	≤ 0.5 %	≤ 0.1 %	≤ 0.1 %	≤ 0.1 %
Load regulation:	≤ 0.7 %	≤ 0.5 %	≤ 0.5 %	≤ 0.5 %
Voltage stabilizing accuracy:	≤ 0.7 %	≤ 0.5 %	≤ 0.5 %	≤ 0.5 %
Dynamic Response	200 micro sec			
Noise / Acoustics	≤ 55 dB			
Features	a. Auto change over (from float to boost & boost to float) b. Battery test facility to check condition of the battery c. Hot swappable feature of modules d. Modules are equipped inbuilt fans (ambient temperature & output current regulated)			
ENVIRONMENTAL				
Lowest start temperature	- 40°C			
Highest work temperature	+ 70°C			
Relative humidity	5% to 95%			
GENERAL				
PROTECTIONS	Switches / Breakers at AC input, DC output & battery path Output short circuit AC input surge protection Output over voltage shutdown Output overload (current limit)			
ALARMS & METERING	Details are on next page (details of options with different controller types)			
Battery Compatible	VRLA / Tubular / Ni-Cd / Plante			
Dimensions	As per rating & requirement			
Paint Shade	RAL 7032 or RAL 7035 or as per requirement			
Cooling of System	Natural or forced cooling for system (Rectifier modules are equipped with in-built fans)			
Cable Entry	Bottom entry / Top entry			
Cabinet Sizes	Width: 19" / 2 X 19" / 3 X 19" Height: upto 2000 mm Depth: 600 / 800 mm			
Ingress Protection	Up to IP 55			
Optional Features	Integral DCDB, BMS/BHMS, IMS & each feeder monitoring			

Controller Options:

Various types of controllers are offered with 24V/48V systems. The details of these controllers are shown in table below:

	Controllers (24V or 48V)		
Controller name	M530S	ACU+	EMU10LC
Display size	128 X 64 LCD	LCD with 4/16 characters	7" TFT HD LCD Touch Screen
Output voltage range	21 V-29V / 42-58V	21 V - 39V / 42V-58V	21 V - 39V / 42V-68V
Output current range	20% - 100% of rated current	20% - 100% of rated current	20% - 100% of rated current
Parameters monitored	Input Voltage Output Voltage Output Current Battery Voltage Battery Current Load Voltage Load Current	Input Voltage Output Voltage Output Current Battery Voltage Battery Current Load Voltage Load Current	Input Voltage Input Current Output Voltage Output Current Battery Voltage Battery Current Load Voltage Load Current
Alarms	AC mains failure Rectifier module failure Battery low, DC/DC converter failure DC under Voltage Fan failure Thermal derating (of rectifier output due to high temperature)	AC mains failure Rectifier module failure Battery low DC/DC converter failure DC/DC converter failure Fan failure Thermal derating (of rectifier output due to high temperature)	AC mains failure Rectifier module failure Battery low DC/DC converter failure DC Over voltage Fan failure DC Insulation failure AC Breaker trip alarm (opt.), DC Breaker trip alarm (opt.) Battery Breaker trip alarm(optional) DC feeder grounding alarm(optional)
Communication	RS 485	RS 232 / RS 485 / Ethernet	RS 232 / RS 485 / Ethernet
Protocols	YDN23	HTTP, SNMP, EEM, SocTpe, Rsoc	CDT / MODBUS IEC 61850
Battery supports	VRLA	VRLA / Tubular / Ni-Cd / Plante	VRLA / Tubular / Ni-Cd / Plante
Max. No of rectifier modules monitored	30	60	32
Potential free contact	5	6	5
BHMS / BMS	N/A	Available (Optional)	Available (Optional)
Insulation monitoring (IMS)	N/A	N/A	Available (Optional)
Feeder status monitoring (on/off/trip)	N/A	N/A	Available (Optional)

Controller Options:

Various types of controllers are offered with 110V/220V systems. The details of these controllers are shown in table below:

	Controllers (110V or 220V)	
Controller name	PSME 01	EMU10
Display size	1.6" x 3.1" LCD	7" TFT HD LCD Touch Screen
Output voltage range	88V -143V / 176V-286V	88V-160V / 176V-320V
Output current range	20% - 100% of rated current	20% - 100% of rated current
Parameters Monitored	Input Voltage Output Voltage Output Current Battery Voltage Battery Current Load Voltage Load Current	Input Voltage Input Current Output Voltage Output Current Battery Voltage Battery Current Load Voltage Load Current
Alarms	AC mains failure Rectifier module failure Battery low DC/DC converter failure DC under voltage DC Over voltage Fan failure DC Insulation failure AC Breaker trip alarm (optional) DC Breaker trip alarm (optional) Battery Breaker trip alarm(optional)	AC mains failure Rectifier module failure Battery low DC/DC converter failure DC under voltage, DC Over voltage Fan failure DC Insulation failure AC Breaker trip alarm (optional) DC Breaker trip alarm (optional) Battery Breaker trip alarm(optional) DC feeder grounding alarm (optional)
Communication	RS 232 / RS 485	RS 232 / RS 485 / Ethernet
Protocols	CDT / MODBUS	CDT / MODBUS / IEC 61850
Battery supports	VRLA / Tubular	VRLA / Tubular / Ni-Cd / Plante
Max. No of rectifier modules monitored	16	32
Potential free contact	1 (Summary Contact)	5
BHMS / BMS	N/A	Available (optional)
Insulation monitoring (IMS)	N/A	Available (optional)
Feeder status monitoring (on/off/trip)	N/A	Available (optional)

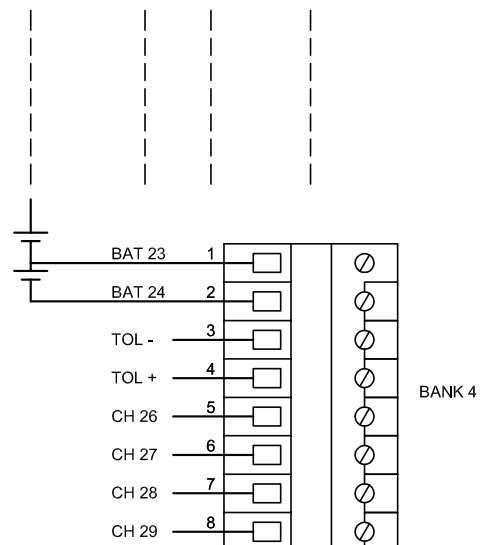
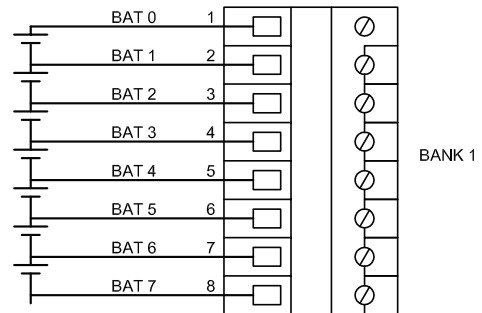


UtilitySure™ is a reliable industrial modular rectifier battery charger with state-of-the-art high frequency switching based switch-mode power supply. UtilitySure™ is specially designed to meet the most demanding industry specifications and includes a wide choice of ratings and operator friendly features.

SPECIAL FEATURES

1. BATTERY MONITORING SYSTEM (BHMS / BMS) :

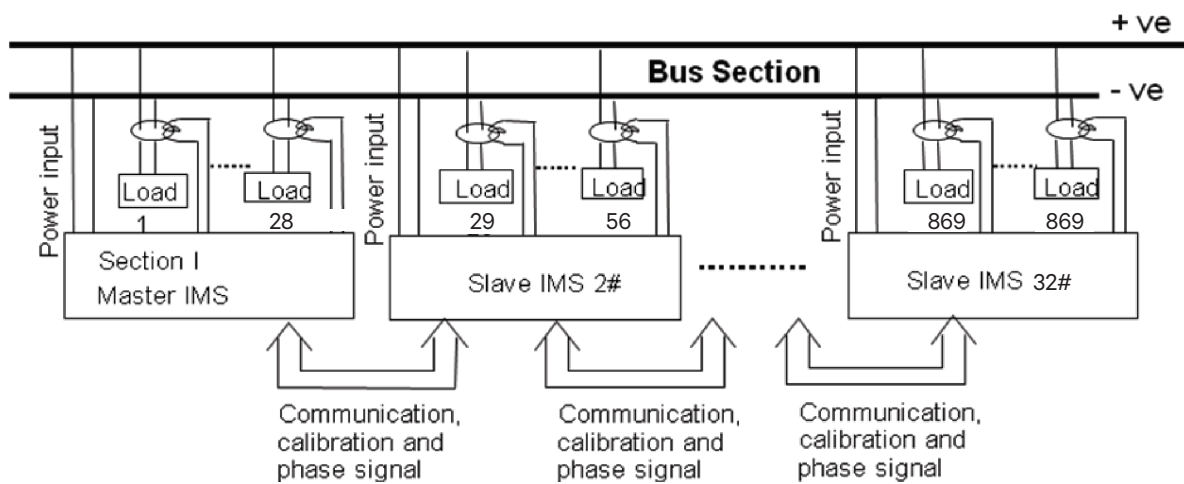
An integral part of the charger, with the same controller, both charger and BMS can be monitored. Battery sensing modules (EBU-01) each having 24 voltage channels (0.1V-16.5V), 1 current channel and 2 temperature channels are based on number of cells that need to be monitored. For example, suppose there are 55 cells of VRLA with a 110V DC system; then 3 nos. of EBU-01 modules are required for battery monitoring. The maximum number of cells that can be monitored are 240 cells with EMU10 controller. Suitable for 1.2 V / 2V / 12 V battery monitoring.



2. INSULATION MONITORING SYSTEM (IMS) :

IMS is used to detect earth leakage in individual DC feeders. In any leakage develops between +ve/-ve DC line and earthing, then the fault is detected and immediately faulty feeder number and magnitude of leakage is displayed on the controller's display.

For this to be effective, a Hall effect CT has to be used in each feeder. These CT signals will be connected to the charger controller through EGU-01 sampling board. The connection drawing of IMS is as shown below: It can monitor upto 768 number of feeders insulation status.



3. FEEDER STATUS (ON/OFF/TRIP) MONITORING :

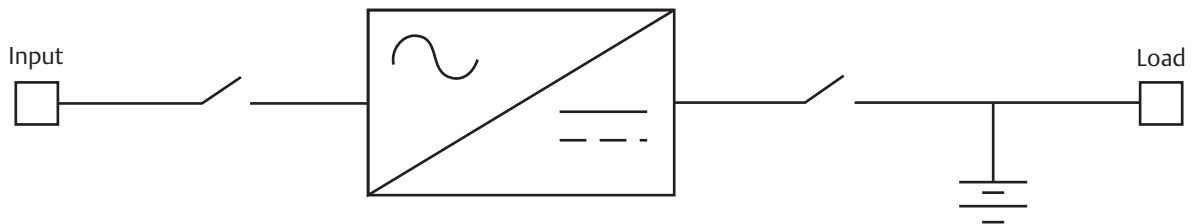
Tripping of DC feeders can be easily monitored by connecting each feeder (MCB/MCCB) trip contact to EGU-01 sampling module which will send signal to controller(EMU10). One EGU-01 can have 28 feeder inputs.

POSSIBLE CONFIGURATIONS:

1. FCBC

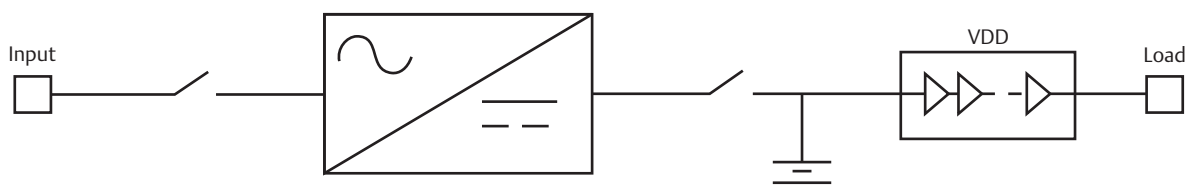
In this configuration, charger is connected directly to battery and load. Normally, the charger will be in float mode trickle charging the battery and supplying the load. When AC mains fail the battery will supply the load. On restoration of power, the charger will switch to boost mode, charging the battery and supplying the load. In the mode, boost voltage will be appeared across the load terminal.

There is also an option for integral DC distribution board.



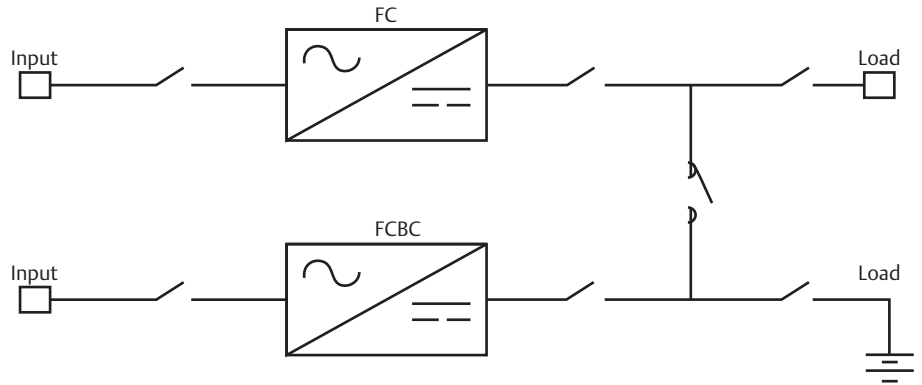
2. FCBC WITH VOLTAGE DROPPING DIODES

This configuration is very similar to the one described above. The extra feature is Dropper Diodes Chain which is required when there is only one FCBC and battery boost charging voltage is far high and if the voltage at load terminals needs to be limited within +/-10% of nominal system voltage. During float mode and AC mains fails condition the VDD shall be bypassed through DC contractor.



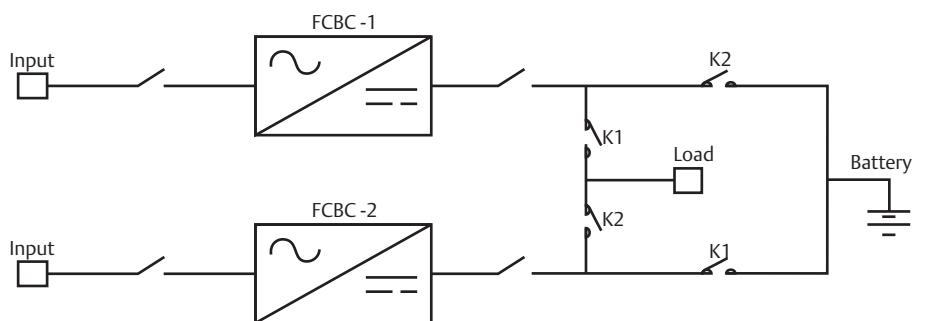
3. FC & FCBC

Here, one charger will always be in float mode (FC) and the other charger switches between float and boost modes based on battery condition (FCBC). When AC mains are ON, both chargers will be in float mode sharing the total load and trickle charging the battery. When AC mains fail, then contactor will be ON and load will be supplied by battery. Upon resumption of power, FCBC will switch to boost mode to boost charge the battery. Simultaneously, the contactor will be OFF. In this condition, both the chargers will be working separately, FC supplying to load and FCBC boost charging the battery.



4. DUAL FCBC WITH 1X100% BATTERY, COMMON LOAD :

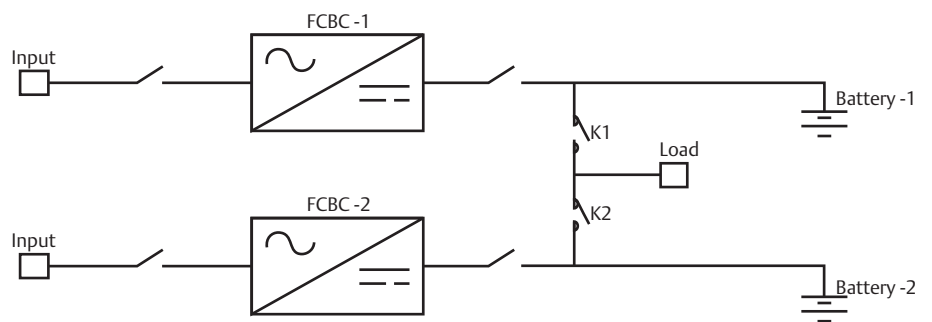
Both the chargers are Float cum Boost Chargers (FCBC). However, only one FCBC can go to boost mode at one time. Normally, both the chargers will be in float mode sharing the total load and trickle charging the battery. When AC mains fail, both the contactors will be ON and load will be supplied by battery. Upon resumption of AC mains, one of the FCBCs will switch to boost mode and the respective contactor will be OFF (K1 for FCBC 1 and K2 for FCBC2), whilst the other FCBC will be in float mode supplying the load.



5. DUAL FCBC WITH 2X100% BATTERY, COMMON LOAD :

In this configuration, both the chargers are float cum boost chargers (FCBC) and the battery's configuration is 2x 100%. Each battery has 1 battery connected directly to it; however only 1 charger can go to boost mode at a time. If battery 1 needs boost charging, then FCBC-1 will go to boost mode to turbo charge the battery 1 and K1 will be OFF. At this time FCBC-2 will be in float mode trickle charging the battery-2 and supplying the load.

If battery-2 needs boost charging, then FCBC-2 will go boost mode to boost charge the battery-2 and K2 will be OFF. At this time, FCBC-1 will be in float mode trickle charging the battery-1 and supplying the load.

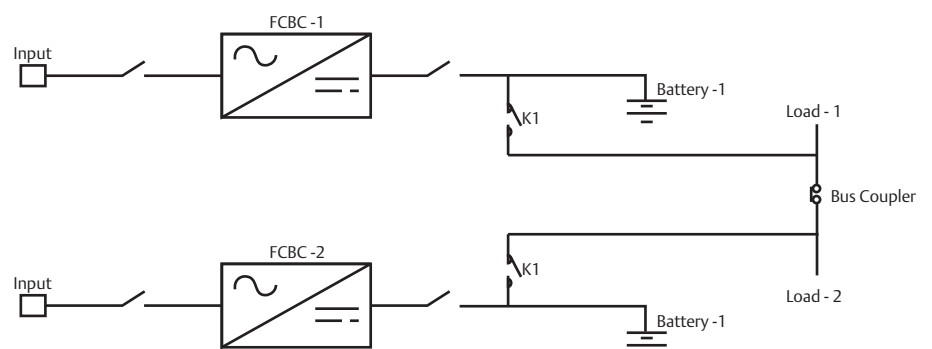


6. DUAL FCBC WITH 2X100% BATTERY, DUAL LOAD WITH BUS COPULER

Both the chargers have their respective batteries, but still only one charger can go to boost mode at a time. The bus coupler can be on auto/manual mode. (If required, we can give both chargers online boost charging as an option.)

If battery-1 needs boost charging, then FCBC-1 will go boost mode to turbo charge the battery-1 and K1 will be OFF.

If it is a manual system, then bus coupler has to be turned ON before any of the chargers go to boost mode. If it is on auto mode, then bus coupler will become ON whenever the chargers go to boost mode.





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