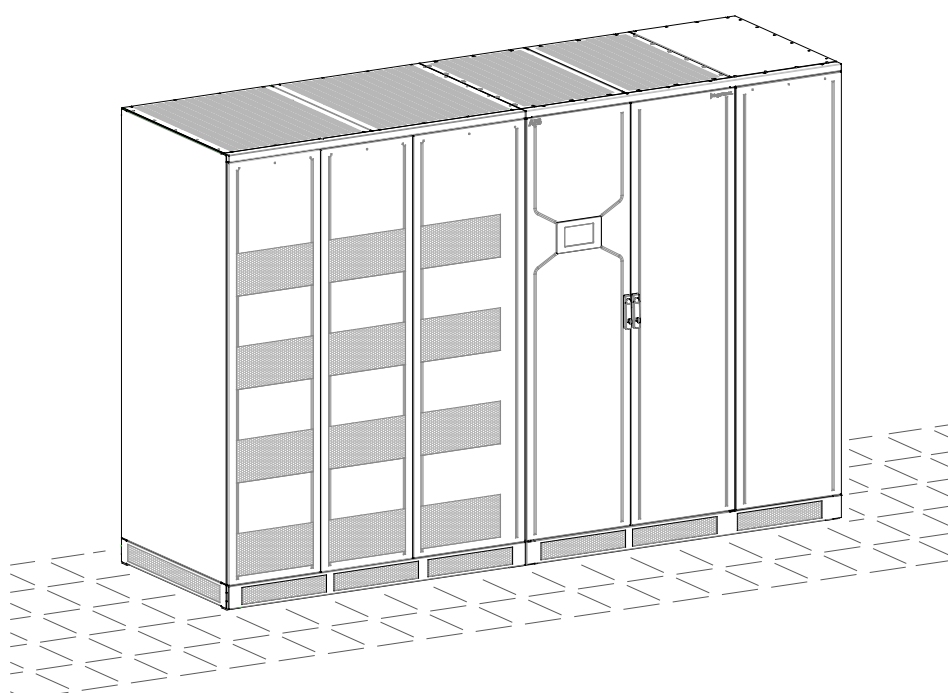

UPS TECHNICAL DATA SHEET

MegaFlex

1000 to 1600 kW UL S1



About this document

Document information

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Contents

1	Introduction	4
1.1	Key features and benefits.....	4
1.2	Mechanical characteristics	5
1.3	General specification	6
1.4	Electromagnetic compatibility	6
1.5	Environmental characteristics.....	6
2	Input electrical characteristics	7
2.1	Input ac power distribution system.....	7
2.2	Input current and overload characteristics	7
3	Output electrical characteristics.....	8
3.1	Output voltage	8
3.2	Output frequency.....	8
3.3	Output current.....	8
3.4	Power factor	9
3.5	Efficiency	9
3.6	Heat rejection and cooling air.....	10
3.7	Static Bypass switch	11
3.8	eBoost™ operating mode (option).....	11
4	Battery and energy storage	12
5	Control & Monitoring	13
5.1	System display.....	13
5.2	Communication interfaces	13
6	Options.....	14
6.1	Connectivity options	14
6.2	Options in UPS cabinet.....	14
6.3	Options in additional cabinet	14
7	UPS block diagram, Line protection and cables section.....	15
7.1	Block diagram input Utility.....	15
7.2	Line protection	15
7.3	Cables section	16

1 Introduction

ABB MegaFlex 1000 to 1600 kW is a three-phase Double Conversion Uninterruptable Power Supply (UPS) providing power protection for critical infrastructure that need zero downtime as medium-large Data Centers, transportation control rooms, commercial and financial buildings.

The MegaFlex 1000 to 1600 kW is a Monolithic Transformer-free UPS with 3-level Inverter technology.

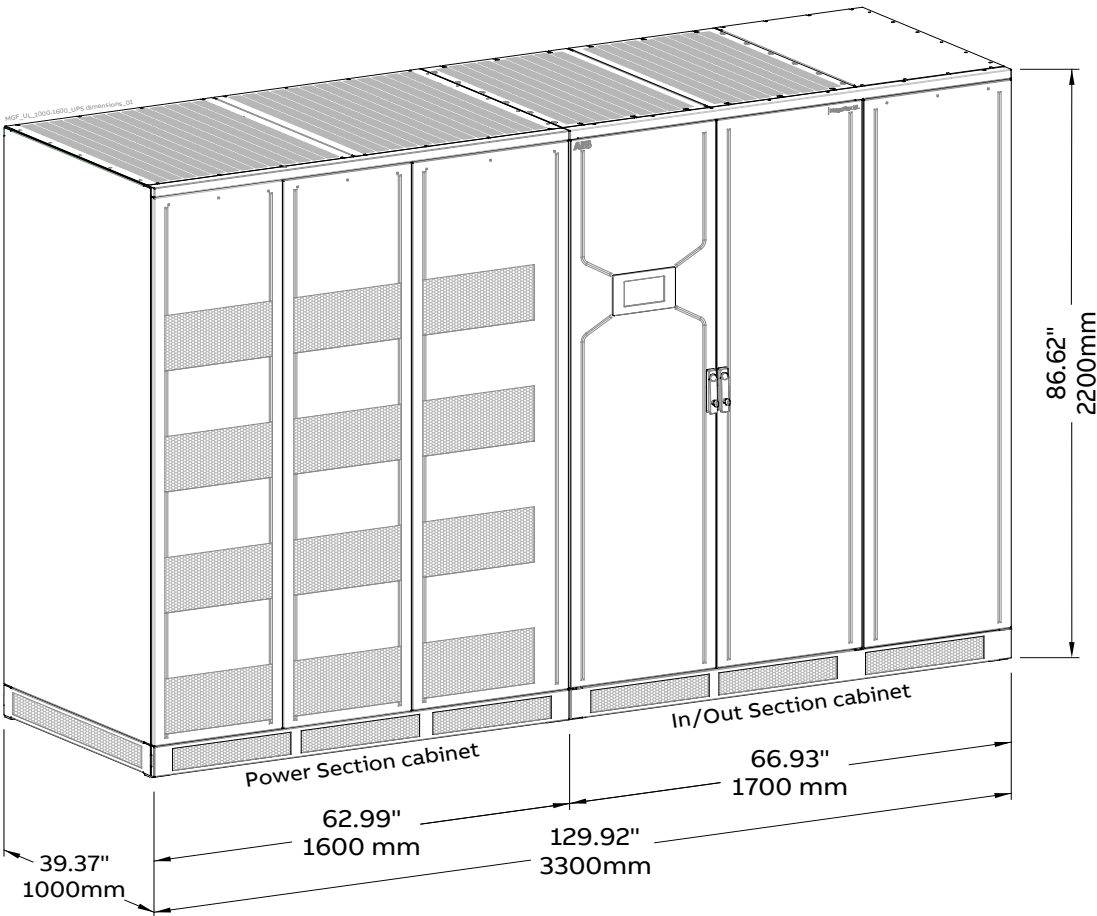
It provides best –in-class efficiency and robust electrical protection.

1.1 Key features and benefits

RPA™	Redundant, reliable and scalable power up to 9600kW thanks to the Redundant Parallel Architecture (RPA) providing redundancy of power (N+1), control and communications.		Up to 96.6% Double Conversion Efficiency and 99% in eBoost™ mode , reduces energy losses minimizing cooling requirements and operating cost.
eBoost™ Plus	eBoost™ operating mode allows the energy flow to pass through the Bypass line and provides power conditioning when combined with Lagging Power Factor Loads.	Cable Saver	Up to 25% more flexibility on cable length in case of RPA Parallel System.
Technology	- Highly reliable and efficient tri-level conversion - Automatic or manual multi-mode operation	Operating Efficiency	- Up to 96.6% efficiency in premium protection mode (double conversion) - Up to 99% efficiency in premium energy save mode (eBoost™)
Features	- Multi-Mode Efficiency - Superior Input, Output & Physical Characteristics - Advanced User Interface - Reliability, Diagnostic & Monitoring Enhancements	Key application	- Data Centers - Healthcare Facilities - Financial Institutions - Colleges/Universities



1.2 Mechanical characteristics



Dimensions (W x D x H)	129.92 x 39.37 x 86.62 inches / 3300 x 1000* x 2200 mm		
	*) For seismic installations allow additional 3" (76 mm) spacing at rear of the UPS to accommodate anchoring when placing against the wall!		
Weight	MegaFlex 1000 – 1100 – 1200		
	UPS complete:	9150 lbs	4150 kg
	Power Section cabinet:	4564 lbs	2070 kg
	In/Out Section cabinet:	4586 lbs	2080 kg
	MegaFlex 1500 & 1600		
	UPS complete:	10274 lbs	4660 kg
Floor loading (UPS complete)	MegaFlex 1000 – 1100 – 1200		MegaFlex 1500 & 1600
	265 lbs/sq.ft / 1294 kg/m²		315 lbs/sq.ft / 1538 kg/m²

1.3 General specification

Topology	True double conversion (VFI - Voltage Frequency Independent) transformerless
Configuration	Stand-alone
Fault current rating	UPS is designed for installation in an electrical system up to 100kA
Audible noise level (at 5 ft. / 1.52 m)	80 dBA in double conversion mode 70 dBA in eBoost™ mode
Standards	ETL Listed to UL 1778, ANSI C62.41b
Access (Operator access or restricted access)	Front and top service access
Degree of protection against hazards and water ingress	IP20
Ventilation	Forced ventilation with fan failure detection and fan speed regulation
UPS frame cabinet color	RAL 9005 (black)
Transport	On pallet Cabinet suitable for handling by forklift
Installation and maintenance access	Front access required for normal maintenance
Mounting	Floor mounting holes provided
Cooling	Forced air
Cable entry	Bottom or Top
RPA – Redundancy Parallel Architecture	Up to 6 units for redundancy or capacity in RPA Parallel System configuration (option)
eBoost™ Operation Mode	Option (see 3.8)

1.4 Electromagnetic compatibility

Emission	[Cat]	EN/IEC 62040-2 Category C3
Electrostatic discharge immunity	[kV]	4kV contact / 8kV air discharge

1.5 Environmental characteristics

Ambient operating temperature range	[° F/° C]	32 - 104° F / 0 - 40° C
Relative humidity range	[%]	≤ 95%, non-condensing
Altitude without de-rating	[ft/m]	Up to 3280 ft / 1000 m
Altitude with de-rating	[ft/m]	4921 ft / 1500 m: -2.5% 6526 ft / 2000 m: -5% 8202 ft / 2500 m: -7.5% 9843 ft / 3000 m: -10%
Ambient storage temperature range	[° F/° C]	-13 - 131° F / -25 - 55° C

2 Input electrical characteristics

2.1 Input ac power distribution system

Configuration		Three phases Rectifier bridge with three level IGBT technology
Input AC power distribution system compatibility (earthing system)		3-wire + PE, HRG compatible
Input voltage window		480 Vac +/- 15%
Input rated short-time with- stand current (I_{xx})	[kA]	100 (1000 to 1600kW)
Input frequency window		60 Hz +/- 10% (54 - 66 Hz)
Utility feed		Single or Dual input feed for Rectifier and Bypass

2.2 Input current and overload characteristics

		1000	1100	1200	1500	1600
Rated input power (Rated Output Power & Battery charger, PF 1)	[kW]	1043	1143	1250	1560	1663
Max input power (rated Output Power and max Battery recharge current, PF 1)	[kW]	1145	1263	1352	1698	1802
Nominal current on Rectifier at full Load	[A]	1260	1385	1510	1890	2015
Max current on Rectifier during Battery recharge at full Load	[A]	1386	1510	1638	2058	2185
Max current on Bypass	[A]	1202	1323	1443	1805	1925
Total harmonic distortion (THDi), 100 % Load - normal mode - linear Load	[%]	< 3%				
Total harmonic distortion (THDi), 100 % Load - normal mode - non-linear Load	[%]	< 5%				
Rectifier input in-rush (% of rated current against time)	[%]	< 100 % of rated current				
Power walk-in	[s]	15				
Rectifier input power factor (rated linear Load; rated non-linear Load)		0.99 at 100% rated Load				

3 Output electrical characteristics

Output AC power distribution system compatibility (earthing system)	3-wire + PE, HRG compatible
---	-----------------------------

3.1 Output voltage

Output rated voltage	[V]	480 V ph-ph	
Output voltage stability	[%]	Static: Dynamic (step Load 0%-100%-0) Dynamic (step Load 0%-50%-0)	+/- 1 +/- 3 +/- 2
Recovery time +/- 1%	[]	< 20	
Total harmonic distortion (THDu), 100% Load - normal mode – linear	[%]	< 3	
Total harmonic distortion (THDu), 100% Load - normal mode non linear	[%]	< 5	

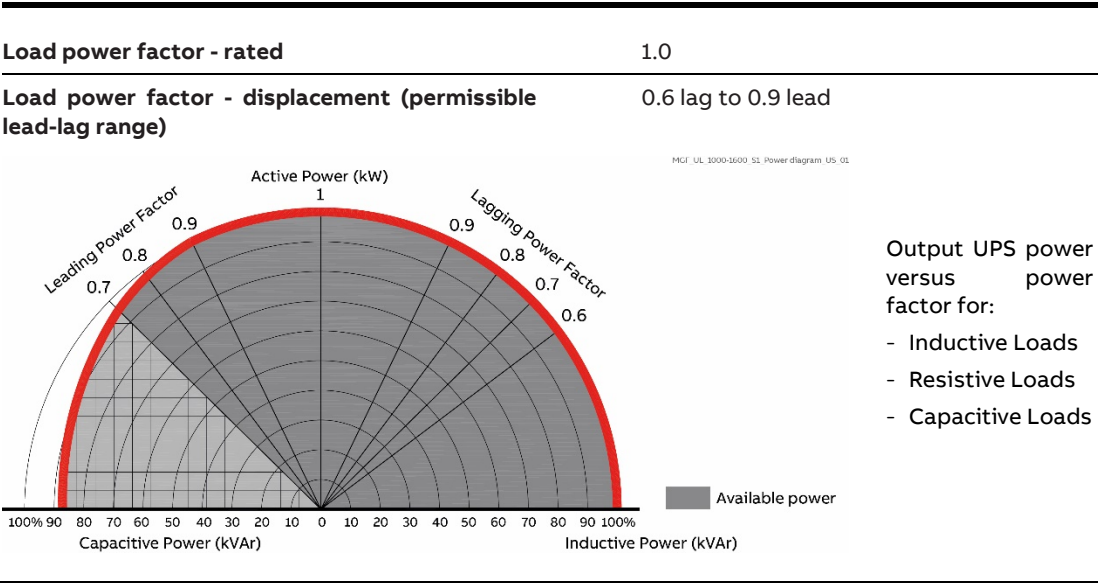
3.2 Output frequency

Output rated frequency	[Hz]	60 Hz	
Output frequency tolerance	[%]	Synchronized with mains Free running	+/- 4 +/- 0.1

3.3 Output current

		1000	1100	1200	1500	1600
Output rated current (480 V configuration)	[A]	1205	1323	1445	1805	1925
Output overload (% of rated current / time duration) at 77° F / 25° C, 480 V rated voltage	[%/s]	150% 125% 110% 103%	30 sec 1 min 10 min continuous			
Output current limitation, "short circuit current" (% or rated current / time duration, 480V rated voltage)	[%/s]	2.2 x In, 100 ms ph-ph				
	[A]	2651	2910	3175	3970	4235
Crest factor capability		3:1				

3.4 Power factor



3.5 Efficiency

		1000	1100	1200	1500	1600
Double conversion efficiency - 100% rated Load	[%]	95.9	96.0	96,1	96,2	96,3
Double conversion efficiency - 75% rated Load	[%]	96,1	96.2	96,3	96,4	96,5
Double conversion efficiency - 50% rated Load	[%]	96,2	96.3	96,4	96,5	96,6
Double conversion efficiency - 25% rated Load	[%]	95,0	95.0	95,1	95,2%	95,3
Efficiency eBoost™ Plus	[%]	Up to 99,0				

3.6 Heat rejection and cooling air

Heat rejection in Double Conversion operating mode At PF=1 Load, nominal voltage/frequency, energy storage disconnected		25% Load	50% Load	75% Load	100% Load
MegaFlex 1000	[BTU/hr]	44907	67408	103881	145914
	[kW]	13158	19751	30437	42753
MegaFlex 1100	[BTU/hr]	49398	76473	112234	156427
	[kW]	14474	21132	32588	45833
MegaFlex 1200	[BTU/hr]	52756	76473	118018	166209
	[kW]	15457	22407	34579	48699
MegaFlex 1500	[BTU/hr]	64531	92840	143387	202223
	[kW]	18908	27202	42012	59252
MegaFlex 1600	[BTU/hr]	67328	96100	148543	209810
	[kW]	19727	28157	43523	61475
Heat rejection in eBoost™ operating mode At PF=1 Load, nominal voltage/frequency, energy storage disconnected		25% Load	50% Load	75% Load	100% Load
MegaFlex 1000	[BTU/hr]	24579	34826	49577	55495
	[kW]	7202	10204	14526	16260
MegaFlex 1100	[BTU/hr]	26044	36356	51612	57171
	[kW]	7631	10652	15122	16751
MegaFlex 1200	[BTU/hr]	28412	37536	53121	58152
	[kW]	8325	10988	15565	17039
MegaFlex 1500	[BTU/hr]	32817	41621	54517	62179
	[kW]	9615	12195	15974	18219
MegaFlex 1600	[BTU/hr]	33570	41579	53943	60736
	[kW]	9836	12183	15805	17796
Max Cooling Air (77°F - 86°F / 25°C - 30°C)					
MegaFlex 1000	[CFM / m ³ /h]	7339 / 12469			
MegaFlex 1100	[CFM / m ³ /h]	7868 / 13368			
MegaFlex 1200	[CFM / m ³ /h]	8360 / 14204			
MegaFlex 1500	[CFM / m ³ /h]	10172 / 17283			
MegaFlex 1600	[CFM / m ³ /h]	10553 / 17930			

3.7 Static Bypass switch

		1000	1100	1200	1500	1600
Static Bypass		Yes				
Rated current	[A]	1205	1323	1445	1805	1925
Primary components		Fully rated continuous duty static switch. Back feed protection + Semiconductor fuse for clearing fault currents				
Transfer limits	[%]	+/- 10% of nominal output voltage (adjustable)				
Bypass voltage tolerance (% of rated voltage at 480 V)	[%]	+/- 10				
Bypass fault clearing capability (% of rated current / time duration at 480 V)	[%/s]	22 x In /10 ms				
Overload capability on Bypass	[%/m]	110% continuous 150% for 1 minute				

3.8 eBoost™ operating mode (option)

Input wiring configuration	480 Vac, 3-phase 3 wire + ground	
Output waveform	Continuously monitored	
Transfer time to Inverter	< 2ms (typical)	
Transfer limits		
Steady-state RMS tolerance	+/- 20 Vrms (adjustable)	
Instantaneous voltage distortion (with respect to Normal Sine wave)	Magnitude	+/- 75Vp
	Duration	500μs (adjustable)
Steady-state frequency tolerance	+/- 3 Hz	
Instantaneous phase shift	0.15 radians (8.5 Deg)	

4 Battery and energy storage

		1000	1100	1200	1500	1600
Energy storage type		No integrated Batteries, external energy storage needed. Line-and-match cabinets available as accessory				
Technology		Lithium ion, VRLA, NiCd				
Design life	[years]	Lithium ion: 15 years VRLA, NiCd: Ref to Battery manufacturer provided information				
Quantity of cells and strings	[pcs]	Lithium ion: 136 cells / 17 modules VRLA 12 Vdc: 40-44 blocks/ 240-264 cells per string				
Nominal voltage (total)	[Vdc]	480 Vdc - 580 Vdc				
Nominal Ah capacity (C10)	[Ah]	Battery type dependent Lithium ion: 67 Ah				
Stored energy time (back-up time at 100% rated Load)	[min]	Up to any autonomy value without derating Refer to Battery autonomy calculator of suppliers for proper sizing				
Restored energy time (re- charge time to 90% capacity)	[h]	Lithium ion: 3 h VRLA: 10 h NiCd: 10 h				
Ambient reference temperature	[° F/° C]	Battery type dependent: Lithium ion: 64.4 - 82.4° F / 18 - 28° C VRLA: 68 - 77° F / 20 - 25° C NiCd: Refer to manufacturer provided information				
Nominal discharge current	[A d.c.]	3000	3000	3000	4000	4000
CHARGING REGIME						
Charge voltage (float, boost) and tolerance band	[V d.c.]	4.20 Vdc/Cell Lithium ion 2.27 Vdc/Cell VRLA				
End of discharge voltage	[V d.c.]	3.20 Vdc/Cell Lithium ion 1.8Vdc/Cell VRLA				
Max Battery charging current	[A]	210 A			280 A	
Battery ripple current max.	[A]	Max. 5% the Battery capacity				
ADDITIONAL INFORMATION						
Cable voltage drop recommendation		1%				
Battery temperature compensation		Supported by standard UPS Temperature sensor available as option				
Battery test		Automatic Battery test performed by UPS				

Note: Lithium-ion battery values indicated in table above are valid just for Samsung SDI 136S product.

5 Control & Monitoring

5.1 System display



The UPS Control Panel is a touch screen graphical display which provide the following information to the user:

- Mimic diagram indication UPS status
- UPS measurements
- History of event (alarms and messages)
- UPS settings
- Operation command
- Parallel UPS configuration

The UPS Control Panel can be provided in the following 14 languages:
English, German, Italian, Spanish, French, Finnish, Polish, Portuguese, Czech, Slovakian, Chinese, Swedish, Russian and Dutch.

5.2 Communication interfaces

RS232 serial port	Standard
EPO - Emergency Power OFF (n/c contact, customer supplied)	Standard
Customer Interface board	Standard
6 programmable signaling voltage-free contacts (available on block terminals)	- Standard information for easy integration and signaling - 27 user settable signals
Connector RJ45	With adaptation cable for a serial port RS232 / sub DB9 connection
Input signals	- GEN ON (emergency power supply ON, n/o contact, customer supplied) - 1 auxiliary signal, with settable functionality

6 Options

6.1 Connectivity options

1. Additional Customer Interface Board
 2. 3-ph SNMP/WEB plug-in Adapter
 3. iUPSGuard
 4. Data Protection
-

6.2 Options in UPS cabinet

1. eBoost™ Operation Mode
 2. RPA Parallel System (Redundant Parallel Architecture)
 3. RPA Parallel System cables 20 ft / 6 m, 40 ft / 12 m, 98 ft / 30 m, 196 ft / 60 m and 279 ft / 85 m
-

6.3 Options in additional cabinet

1. Battery cabinet
 2. Battery sensor
-

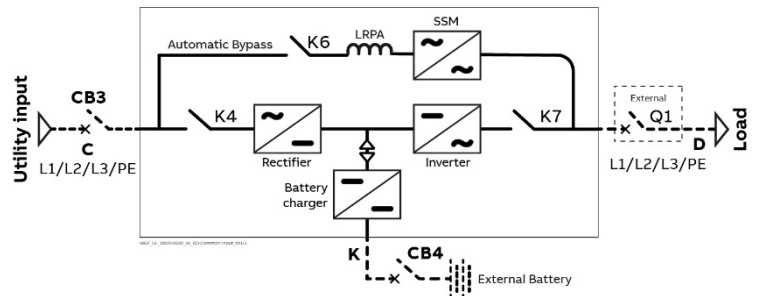
7 UPS block diagram, Line protection and cables section

7.1 Block diagram input Utility

Common Input Utility Rectifier & Bypass

The same power source is to be used for both Bypass supply and Rectifier input (input CB3).

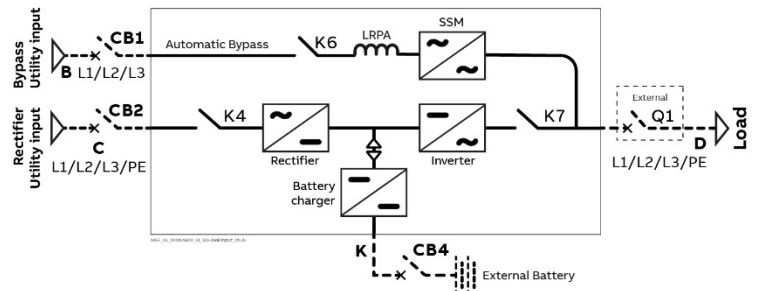
Bear in mind that when the Utility breakers are opened there is a supply failure to the Rectifier as well as to the Automatic Bypass.



Dual Input Utility Configuration Rectifier & Bypass

The Bypass and Rectifier use different power sources (CB1 and CB2 inputs).

In this case, when the Rectifier-input breakers are opened, the Automatic Bypass is supplied by the other connection.



7.2 Line protection

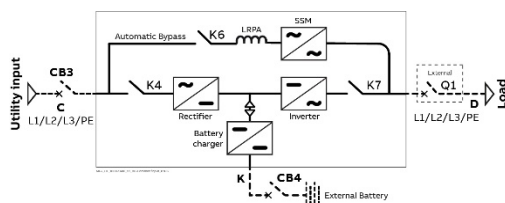
The AC values below are current ratings per phase.

These maximum and nominal ratings should be considered when choosing the appropriate AC over current protection device.

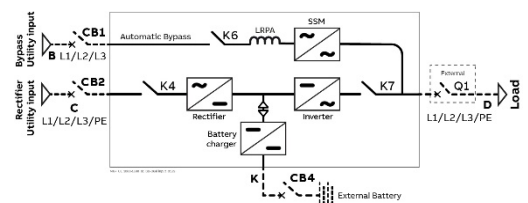
DC current rating is the nominal Battery discharge current with 1.8 V/cell (see below figures).

Wiring shall not be sized for more than 2.0 Vdc/cell.

Common Input Utility Rectifier & Bypass

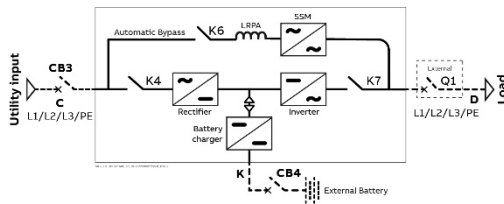


Dual Input Utility Rectifier & Bypass

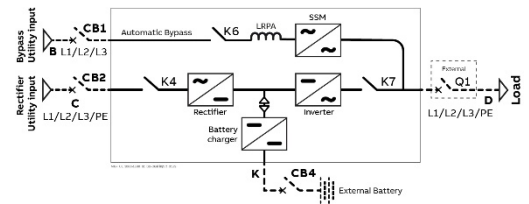


kW	CB1 - AC Input Rectifier		CB2 - AC Input Bypass	CB3 - AC Input		F4 - DC Input
	Nom.	Max.		Nom.	Max.	
1000	1260 A	1386 A	1202 A	1260 A	1386 A	2388 A
1100	1385 A	1510 A	1323 A	1385 A	1510 A	2626 A
1200	1510 A	1638 A	1443 A	1510 A	1638 A	2865 A
1500	1890 A	2058 A	1805 A	1890 A	2058 A	3582 A
1600	2015 A	2185 A	1925 A	2015 A	2185 A	3820 A

Common Input Utility Rectifier & Bypass



Dual Input Utility Configuration Rectifier & Bypass



Size of Branch Circuit Over Current Protection:

Every power line must be singularly protected by UL 489 overcurrent protective devices (provided by others) according to the ampacity table below.

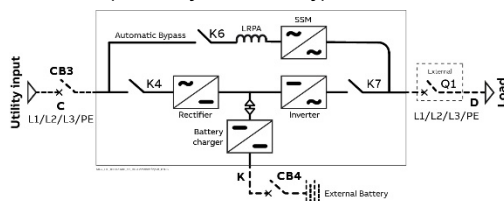
Non-standard Circuit Breakers shall be restricted to access, in accordance with **NEC 240.6(c)**.

Maximum input short circuit current at CB1 and CB2 is 100 kArms.

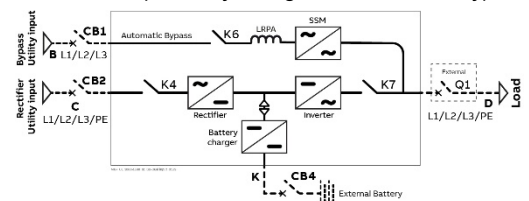
kW	CB1 - AC Input Rectifier 100% Rated	CB2 -AC Input Bypass 100% Rated	CB 3 - AC Input 100% Rated	CB 4 - DC Input 100% Rated
1000	1400 A	1400 A	1400 A	3000 A
1100	1600 A	1400 A	1600 A	3000 A
1200	2000 A	1600 A	2000 A	3000 A
1500	2500 A	2000 A	2500 A	4000 A
1600	2500 A	2000 A	2500 A	4000 A

7.3 Cables section

Common Input Utility Rectifier & Bypass



Dual Input Utility Configuration Rectifier & Bypass



Maximum recommended cable size (type THWN/THHN copper, 167°F/75°C) * per phase/pole and ground conductors.

Each conduit shall terminate its ground conductor to UPS ground bus bar. Wires shall be rated 600V.

Conduits (provided by others) must be installed between UPS and the power source.

kW	Rectifier Input (A & C)	Bypass Input (B)	DC Input (K)	AC Output (D)
1000	6x500 + AWG 4/0	6x500 kcmil + AWG 4/0	6x500 kcmil + AWG 4/0	8x600 + 250 kcmil
1100	8x500 kcmil + AWG 4/0	6x500 kcmil + AWG 4/0	8x500 kcmil + AWG 4/0	8x600 + 250 kcmil
1200	8x500 + 250 kcmil	8x500 kcmil + AWG 4/0	8x500 kcmil + AWG 4/0	8x600 + 250 kcmil
1500	10x500 + 350 kcmil	8x500 + 250 kcmil	8x500 + 50 kcmil	14x600 + 50 kcmil
1600				

*) for AA-8000 Aluminum cables contact ABB Service Center.

Wiring! Wire sizing according to NEC for 167°F (75°C) copper or aluminum wire at 104°F (40°C).

Wiring requirements:

Rectifier AC input/Bypass AC input /
AC output ports.

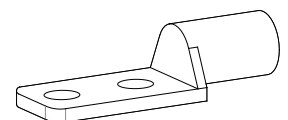
3-phase, 3-wire plus ground (each conduit shall contain one cable per circuit's phase and one ground cable).

DC Input.

2 poles (positive and negative) plus ground (each conduit shall contain one positive, one negative and one ground cable).

Recommended two-hole cable lugs:

Cable Size	T&B Copper / Two holes	T&B Aluminum / Two holes
500 kcmil	TnB 54223	-
750 kcmil	-	TnB 60278NT





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