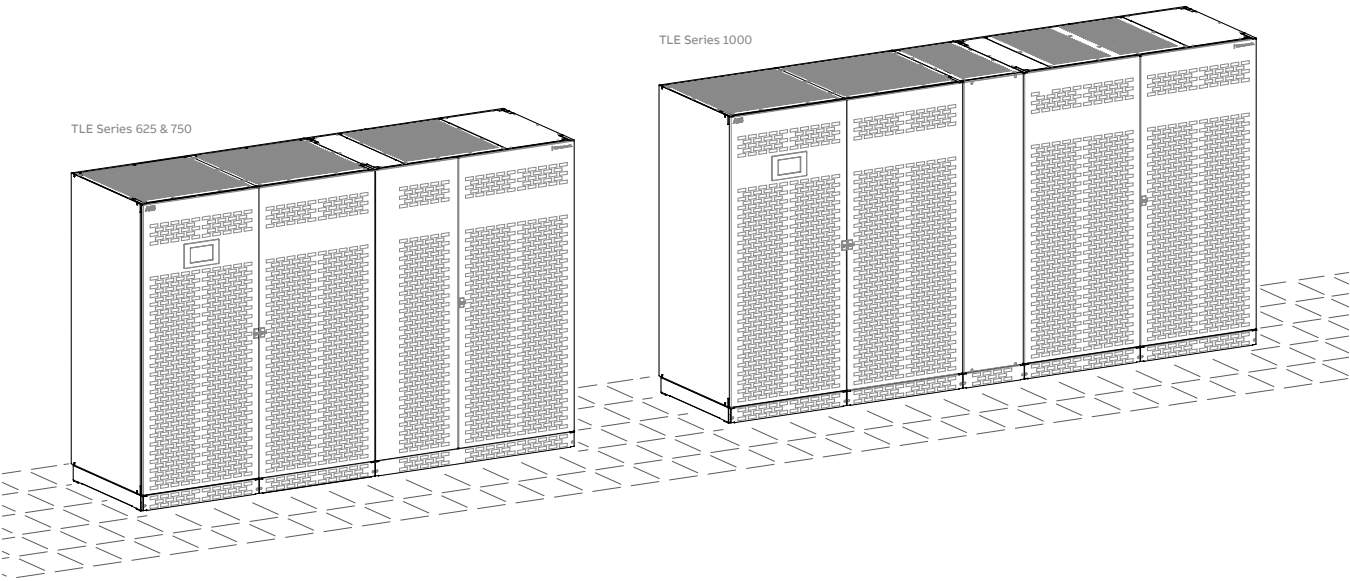


UPS TECHNICAL DATA SHEET

# TLE Series

## 625 to 1000 kVA UL S2



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# About this document

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## Document information

<b>File name</b>	ABB_UPS_TDS_TLE_SUL_M62_1M0_2US_REV-B
<b>UPS model</b>	TLE Series 625 - 750 - 1000 kVA UL S2B
<b>Date of issue</b>	04/20/2021
<b>Issued by</b>	Product Marketing After Sales
<b>Checked by</b>	R&D
<b>Document number</b>	4NWD005342
<b>Article number</b>	4NWP106234R0001
<b>Revision</b>	REV-B

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# 1 Introduction

## 1.1 Description

The TLE Series 625 to 1000 Uninterruptible Power Supply (UPS) is a three-phase high power product with best-in-class multi-mode efficiency for global critical power needs.

The TLE Series 625 to 1000 platform establishes ABB UPS technology leadership in high power applications with industry leading differentiation in efficiency, output power capacity and footprint.


ABB's TLE Series 625 to 1000 is one of the most energy efficient multi-mode UPS in the industry and provides world-class energy efficiency across the operating load range.

The TLE Series 625 to 1000 delivers efficiency up to 96.5% in double conversion mode and 98.9% in eBoost™ operating mode.

This system efficiency substantially reduces operating and cooling costs thus providing a reduced cost of ownership and improved power usage effectiveness (PUE) compared to conventional UPS.

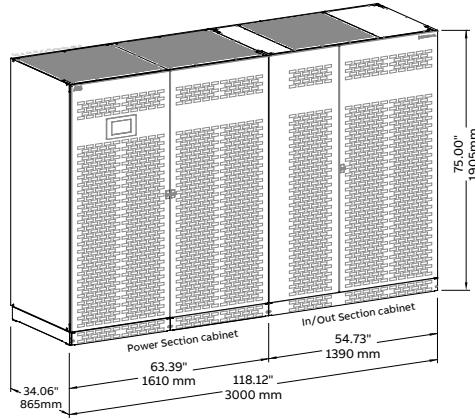
Reliability & power can be further increased by paralleling up to 6 units utilizing ABB's unique RPA\* (Redundant Parallel Architecture) technology.

## 1.2 Key features and benefits

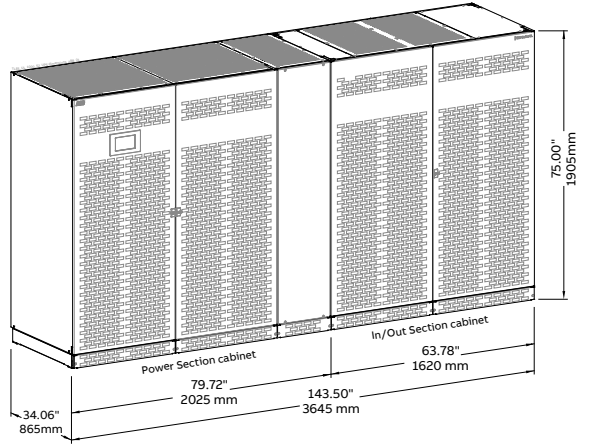
<p><b>RPA™</b></p>	<p><b>Redundant, reliable and scalable power up to 6000kW</b> thanks to the Redundant Parallel Architecture (RPA) providing redundancy of power (N+1), control and communications.</p>		<p><b>Up to 96.5% Double Conversion Efficiency and 98.9% in eBoost™ mode™</b>, reduces energy losses minimizing cooling requirements and operating cost.</p>
<p><b>eBoost™</b></p>	<p><b>eBoost™ operating mode</b> allows the energy flow to pass through the Bypass line and provides power conditioning when combined with Lagging Power Factor Loads.</p>	<p><b>Cable Saver</b></p>	<p><b>Up to 25%</b> more flexibility on cable length in case of RPA Parallel System.</p>
<p><b>Technology</b></p>	<ul style="list-style-type: none"> <li>- Highly reliable and efficient tri-level conversion</li> <li>- Automatic or manual multi-mode operation</li> </ul>	<p><b>Operating Efficiency</b></p>	<ul style="list-style-type: none"> <li>- Up to 97% efficiency in premium protection mode (double conversion)</li> <li>- Up to 99% efficiency in premium energy save mode (eBoost™)</li> </ul>
<p><b>Features</b></p>	<ul style="list-style-type: none"> <li>- Multi-Mode Efficiency</li> <li>- Superior Input, Output &amp; Physical Characteristics</li> <li>- Advanced User Interface</li> <li>- Reliability, Diagnostic &amp; Monitoring Enhancements</li> </ul>	<p><b>Key application</b></p>	<ul style="list-style-type: none"> <li>- Data Centers</li> <li>- Healthcare Facilities</li> <li>- Financial Institutions</li> <li>- Colleges/Universities</li> </ul>

### 1.3 Mechanical characteristics

TLE Series 625 & 750



TLE Series 1000



#### TLE Series 625 & 750 Dimensions and weights

**Dimensions (W x D x H)** 118.12 x 34.06 x 75.00 inches / 3000 x 865 x 1905 mm

**Weight**

UPS complete:	4850 lbs / 2200 kg
Power Section cabinet:	2976 lbs / 1350 kg
In/Out Section cabinet:	1874 lbs / 850 kg

**Floor loading** 174 lbs/sq.ft / 848 kg/m<sup>2</sup>

#### TLE Series 1000 Dimensions and weights

**Dimensions (W x D x H)** 143.50 x 34.06 x 75.00 inches / 3645 x 865 x 1905 mm

**Weight**

UPS complete:	5732 lbs / 2600 kg
Power Section cabinet:	3638 lbs / 1650 kg
In/Out Section cabinet:	2094 lbs / 950 kg

**Floor loading** 169 lbs/sq.ft / 825 kg/m<sup>2</sup>

## 1.4 General specification

<b>Topology</b>	True double conversion (VFI - Voltage Frequency Independent) transformerless
<b>Configuration</b>	Stand-alone
<b>Fault current rating</b>	UPS is designed for installation in an electrical system up to 100kA
<b>Audible noise level (at 5 ft. / 1.52 m)</b>	78 dBA in double conversion mode 68 dBA in eBoost™ mode
<b>Standards</b>	ETL Listed to UL 1778, ANSI C62.41b
<b>Access (Operator access or restricted access)</b>	Front access only
<b>Degree of protection against hazards and water ingress</b>	Indoor IP 20 and NEMA PE 1
<b>Internal protection</b>	All internal live parts shrouded
<b>Safety</b>	Internal dead front construction
<b>UPS frame cabinet color</b>	RAL 9005 (black)
<b>Transport</b>	On pallet Cabinet suitable for handling by forklift
<b>Installation and maintenance access</b>	Front access required for normal maintenance
<b>Mounting</b>	Floor mounting holes provided
<b>Cooling</b>	Forced air
<b>Cable entry</b>	Top and Bottom standard
<b>RPA – Redundancy Parallel Architecture</b>	Up to 6 units for redundancy or capacity in RPA Parallel System configuration (option)
<b>eBoost™ Operation Mode</b>	Option

## 1.5 Electromagnetic compatibility

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

## 1.6 Environmental characteristics

<b>Ambient operating temperature range</b>	[° F/° C]	32 ÷ 104° F / 0 ÷ 40° C
<b>Relative humidity range</b>	[%]	≤ 95%, non-condensing
<b>Altitude without de-rating</b>	[ft/m]	Up to 3281 ft / 1000 m
<b>Altitude with de-rating</b>	[ft/m]	4921 ft / 1500 m: -2.5% 6526 ft / 2000 m: -5% 8202 ft / 2500 m: -7.5% 9843 ft / 3000 m: -10%
<b>Ambient storage temperature range</b>	[° F/° C]	-13 ÷ 131° F / -25 ÷ 55° C

## 2 Input electrical characteristics

### 2.1 Rectifier

<b>Configuration</b>	Three phases Rectifier bridge with three level IGBT technology
<b>Voltage</b>	480 Vac, 3-phase, 4 wire + ground or 3 wire + ground (+/- 15% without battery discharge)
<b>Frequency</b>	60 Hz +/- 10% (54 ÷ 66 Hz)
<b>Harmonic current distortion</b>	< 5%
<b>Power factor</b>	0.99 lagging
<b>Inrush current</b>	Limited by soft-start circuit
<b>Power walk-in</b>	30 seconds (adjustable)
<b>Output voltage tolerance</b>	+/- 1%
<b>DC ripple voltage</b>	+/- 1%
<b>DC ripple current</b>	Max. 5% of Battery capacity expressed in amps

### 2.2 UPS rating vs. Current limits

		625 kVA/kW	750 kVA/kW	1000 kVA/kW
<b>Nominal input at 100% Load</b>	[Amps]	789.1	945.0	1260.0
<b>PF=1 Load, fully chrg'd Battery</b>	[kVA]	656.0	785.6	1047.5
	[kW]	649.4	777.7	1037.0
<b>Maximum input at 100% Load</b>	[Amps]	971.1	1025.0	1367.0
<b>PF=1 Load, max chrg current</b>	[kVA]	724.3	852.3	1136.3
	[kW]	717.0	843.7	1125.0
<b>Maximum charge current</b>	[Amps]	135	135	180

## 2.3 Static Bypass

<b>Input connection</b>	Single input (standard) or dual input (option)
<b>Primary components</b>	Fully rated continuous duty static switch Back feed protection + Semiconductor fuse for clearing fault currents
<b>Transfer limits</b>	+/- 10% of nominal output voltage (adjustable)
<b>Overload capability on Bypass</b>	110% continuous 150% for 1 minute
<b>Short circuit capability on Bypass</b>	1000% for 1/2 cycle (non-repetitive)

## 2.4 eBoost™ operating mode (option)

<b>Input wiring configuration</b>	480 Vac, 3-phase, 4 wire + ground or 3 wire + ground	
<b>Output waveform</b>	Continuously monitored	
<b>Transfer time to Inverter</b>	< 2ms (typical)	
<b>Transfer limits</b>		
<b>Steady-state RMS tolerance</b>	+/- 20 Vrms (adjustable)	
<b>Instantaneous voltage distortion (with respect to Normal Sine wave)</b>	Magnitude	+/- 75Vp
	Duration	500μs (adjustable)
<b>Steady-state frequency tolerance</b>	+/- 3 Hz	
<b>Instantaneous phase shift</b>	0.15 radians (8.5 Deg)	



## 3 Output electrical characteristics

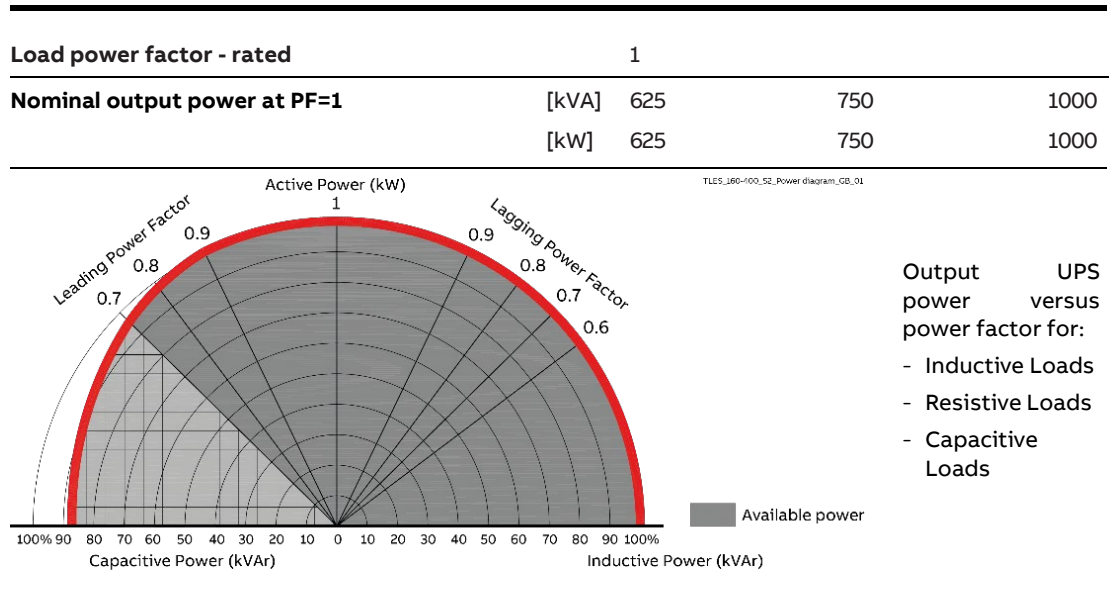
### 3.1 Inverter

<b>Nominal output voltage</b>	480 Vac, 3-phase, 4 wire + ground or 3 wire + ground		
<b>Inverter bridge</b>	Three phases Inverter bridge with three level IGBT technology IGBT		
<b>Output waveform</b>	True sine wave		
<b>Output voltage tolerance</b>			
Static	[%]	+/- 1%	
Load step 0 - 100 - 0%	[%]	+/- 3%, recovering to within +/- 1% in 1 cycle	
Load step 0 - 50 - 0%	[%]	+/- 2%, recovering to within +/- 1% in 1 cycle	
100% unbalanced load (Ph-N)	[%]	+/- 3%	
<b>Output voltage distortion</b>			
100% linear Load	[%]	3% THD maximum	
100% non-linear Load (per IEC 62040)	[%]	5% THD maximum	
<b>Crest factor capability</b>	>3:1		
<b>Output neutral rating</b>	[%]	200%	
<b>Phase displacement</b>			
At 100% balanced Load	[%]	120°: +/- 1%	
At 100% unbalanced Load	[%]	120°: +/- 2%	
<b>Output frequency</b>			
Free running	[Hz/%]	60Hz, +/-0.1%	
Synchronized with utility	[%]	+/- 4% (adjustable from 57.6Hz to 62.4Hz)	
<b>Overload capability (on Inverter)</b>	125% at PF=1 for 1 minute 150% at PF=1 for 30 seconds		
<b>Short-circuit characteristic</b>	[%/min]	220% for 100 ms, electronically limited	

### 3.2 UPS rating

		625 kVA/kW	750 kVA/kW	1000 kVA/kW
<b>Maximum output current at PF=1</b>	[Amps]	751.8	902.0	1203.0

### 3.3 Power factor



### 3.4 Efficiency

<b>System Efficiency in Double Conversion operating mode</b>		<b>25% Load</b>	<b>50% Load</b>	<b>75% Load</b>	<b>100% Load</b>
<b>At PF=1 Load, nominal voltage/frequency, energy storage disconnected</b>					
TLE Series 625	[%]	94.7	96.4	96.3	96.2
TLE Series 750	[%]	95.4	96.5	96.5	96.3
TLE Series 1000	[%]	95.5	96.4	96.5	96.2
<b>System Efficiency in eBoost™ operating mode</b>		<b>25% Load</b>	<b>50% Load</b>	<b>75% Load</b>	<b>100% Load</b>
<b>At PF=1 Load, nominal voltage/frequency, energy storage disconnected</b>					
TLE Series 300	[%]	96.9	98.1	98.4	98.6
TLE Series 400	[%]	97.1	98.2	98.6	98.8
TLE Series 500	[%]	97.3	98.4	98.7	98.9

### 3.5 Heat rejection and cooling air

<b>Heat rejection in Double Conversion operating mode</b>		<b>25% Load</b>	<b>50% Load</b>	<b>75% Load</b>	<b>100% Load</b>
<b>At PF=1 Load, nominal voltage/frequency, energy storage disconnected</b>					
<b>TLE Series 625</b>	[BTU/hr]	29845	39830	61468	94260
	[kW]	8.7	11.7	18.0	24.7
<b>TLE Series 750</b>	[BTU/hr]	30849	46409	69613	98325
	[kW]	9.0	13.6	20.4	28.8
<b>TLE Series 1000</b>	[BTU/hr]	40195	63712	92817	134783
	[kW]	11.8	18.7	27.2	39.5
<b>Heat rejection in eBoost™ operating mode</b>		<b>25% Load</b>	<b>50% Load</b>	<b>75% Load</b>	<b>100% Load</b>
<b>At PF=1 Load, nominal voltage/frequency, energy storage disconnected</b>					
<b>TLE Series 625</b>	[BTU/hr]	17060	20657	26013	30288
	[kW]	5.0	6.1	7.6	8.9
<b>TLE Series 750</b>	[BTU/hr]	19108	23454	27252	31082
	[kW]	5.6	6.9	8.0	9.1
<b>TLE Series 1000</b>	[BTU/hr]	23671	27741	33707	37951
	[kW]	6.9	8.1	9.9	11.1
<b>Max Cooling Air (77°F - 86°F / 25°C - 30°C)</b>					
<b>TLE Series 625</b>	[CFM]	4240			
<b>TLE Series 750</b>	[CFM]	4944			
<b>TLE Series 1000</b>	[CFM]	6780			

## 4 Battery and energy storage

### 4.1 Battery technical data

<b>Energy storage type</b>		No integrated Batteries, external energy storage needed. Line-and-match cabinets available as accessory
<b>Battery compatibility</b>		Lead-acid or NiCd, VRLA or flooded
<b>Float voltage at 68°F / 20°C</b>	[Vd]	540 Vdc
<b>Number of cells</b>	[pcs]	240 cells (lead acid)
<b>Minimum discharge voltage</b>	[Vdc]	396 Vdc (adjustable)
<b>Recharge time</b>	[h]	10 times the discharge time
<b>Battery ground fault detection</b>		Standard
<b>Automatic and manual Battery test</b>		Standard
<b>Common Battery in RPA Parallel System</b>	[unit]	Up to 4 units
<b>Ambient operating temperature range</b>	[° F/° C]	68 ÷ 77° F / 20 ÷ 25° C (higher the temperature, shorter the storage time of the Battery)
<b>Ambient storage temperature range</b>	[° F/° C]	-4 ÷ 104° F / -20 ÷ 40° C (higher the temperature, shorter the storage time of the Battery)
<b>Storage time (Battery VRLA)</b>	[month]	3 months at 77° F / 25° C (higher the temperature, shorter the storage time of the Battery)
<b>Matching Battery cabinets</b>		On request, see Section 6.1

### 4.2 UPS rating

		625 kVA/kW	750 kVA/kW	1000 kVA/kW
At 100% Load at PF=1	[kVB]	651.7	781	1042
Maximum Discharge Current (1.65V cell)	[A]	1646	1973	2630

# 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

<b>RS232 serial port</b>	Standard
<b>EPO - Emergency Power OFF (n/c contact, customer supplied)</b>	Standard
<b>Customer Interface board</b>	Standard
<b>6 programmable signaling voltage-free contacts (available on block terminals – form 'C' - 1A / 24 Vdc)</b>	<ul style="list-style-type: none"> <li>- Standard information for easy integration and signaling</li> <li>- 27 user settable signals</li> </ul>
<b>Input signals</b>	<ul style="list-style-type: none"> <li>- GEN ON (emergency power supply ON, n/o contact, customer supplied)</li> <li>- 1 auxiliary signal, with settable functionality</li> </ul>
<b>3-ph SNMP/WEB plug-in Adapter</b>	Option
<b>Diagnostic</b>	Internal Waveform Capture. Input and output w/pre and post event data (Field Service Only)

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## 6 Options

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### 6.1 Connectivity options

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

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### 6.2 Options in UPS cabinet

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1. eBoost™ Operation Mode
  2. “IEMi - Intelligent Energy Management integrated” Operation Mode
  3. Dual input Utility
  4. RPA Parallel System (Redundant Parallel Architecture)
  5. 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
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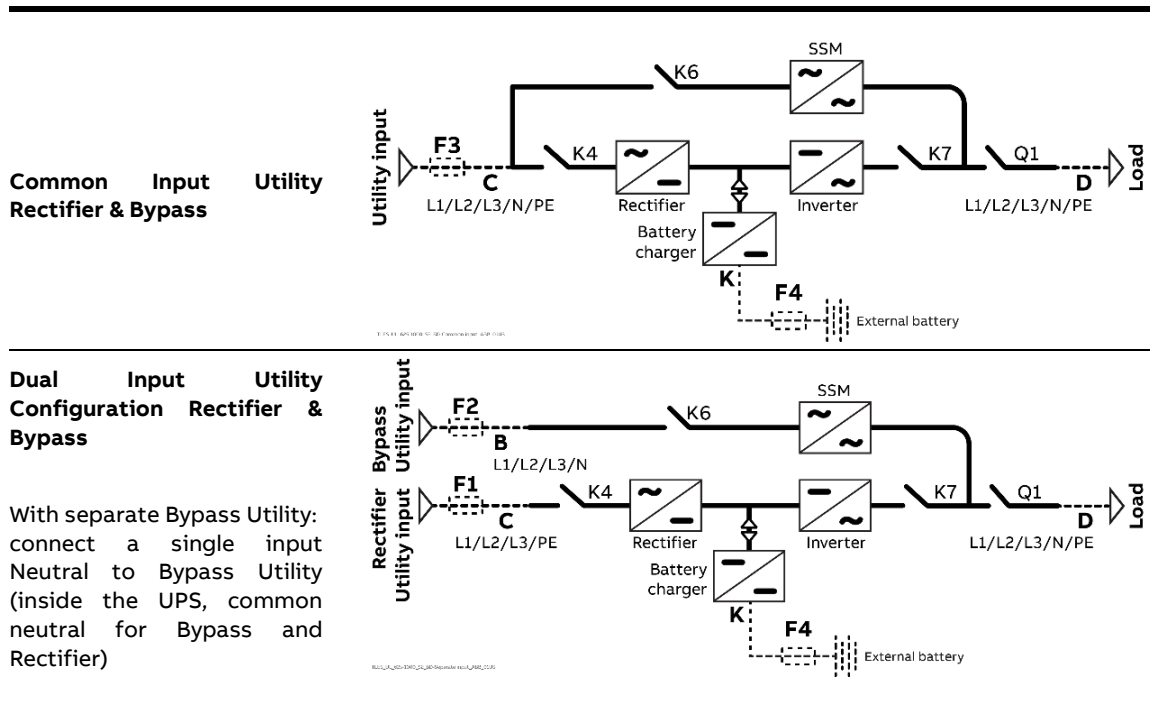
### 6.3 Options in additional cabinet

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1. Input/output transformer  
Available in external cabinets for isolation or voltage transformation
  2. External Maintenance Bypass  
Available in external or as a part of output switchgear cabinet
  3. Battery cabinet
-

# 7 UPS block diagram, Line protection and cables section

## 7.1 Block diagram input Utility



## 7.2 Line protection

The AC values below are current ratings per phase.

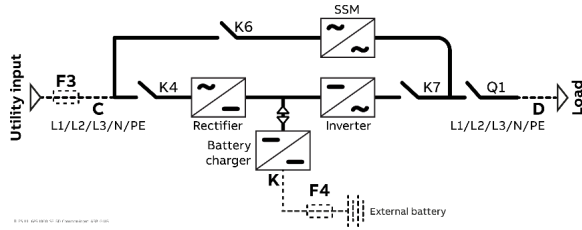
These maximum and nominal ratings should be considered when choosing the appropriate AC over current protection device.

NEC (National Electric Code) Section 210-20 a rule must be applied.

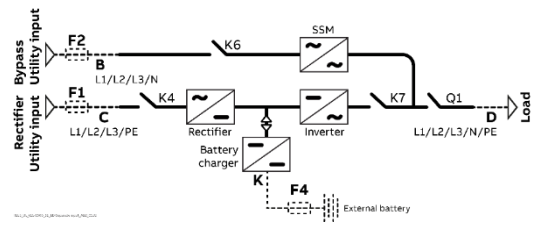
DC current rating is the nominal battery discharge current which the UPS allows

kW	F1 AC Input Rectifier		F2 AC Input Bypass	F3 AC Input		F4 DC Input
	Nom.	Max.		Nom.	Max.	
625	782 A	880 A	752 A	782 A	880 A	1500 A
750	945 A	1025 A	902 A	945 A	1025 A	1810 A
1000	1260 A	1367 A	1203 A	1260 A	1367 A	2410 A

Common Input Utility Rectifier & Bypass



Dual Input Utility Configuration Rectifier & Bypass

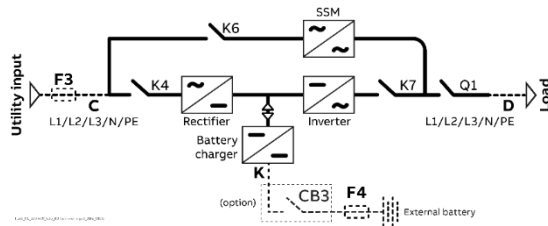


Size of Branch Circuit Over Current Protection - All Models: - "CAUTION - To reduce the risk of fire, only connect UPS to a circuit provided with (see below) maximum amperes branch circuit over current protection in accordance with the NEC (National Electric Code), NSI / NFPA 70

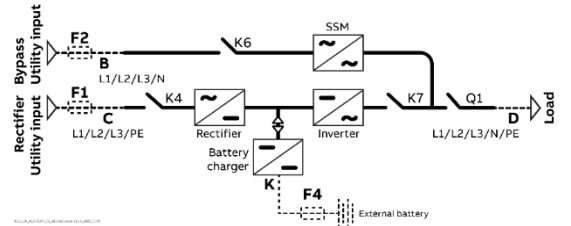
kW	F1 AC Input Rectifier		F2 AC Input Bypass		F3 AC Input		F4 DC Input	
	80% rated	100% rated	80% rated	100% rated	80% rated	100% rated	80% rated	100% rated
625	1200 A	1000 A	1000 A	800 A	1200 A	1000 A	n/a	1600 A
750	n/a	1200 A	1200 A	1000 A	n/a	1200 A	n/a	2000 A
1000	n/a	1600 A	1600 A	n/a	n/a	1600 A	n/a	2500 A

### 7.3 Cables section

Common Input Utility Rectifier & Bypass



Dual Input Utility Configuration Rectifier & Bypass



**Maximum recommended cable size**

kW	Rectifier Input (A & C)	Bypass Input (B)	DC Input (K)	AC Output (D)	GND
625	5 x 500 kcmil	4 x 500 kcmil	6 x 500 kcmil	4 x 500 kcmil	1 x 4/0
750	5 x 500 kcmil	5 x 500 kcmil	8 x 500 kcmil	5 x 500 kcmil	1 x 250 kcmil
1000	6 x 500 kcmil	6 x 500 kcmil	10 x 500 kcmil	6 x 500 kcmil	1 x 350 kcmil

**Wiring!**

Wire sizing according to  
NEC Section 210-20 (a) - Table 310-16  
Use 167°F (75°C) copper or aluminum wire.

**Wiring requirements:**

3-Phase, 4 wire plus Ground  
3-Phase, 4 wire plus Ground  
3-Phase, 4 wire plus Ground  
DC Input 2 wire (positive and negative) plus Ground.







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