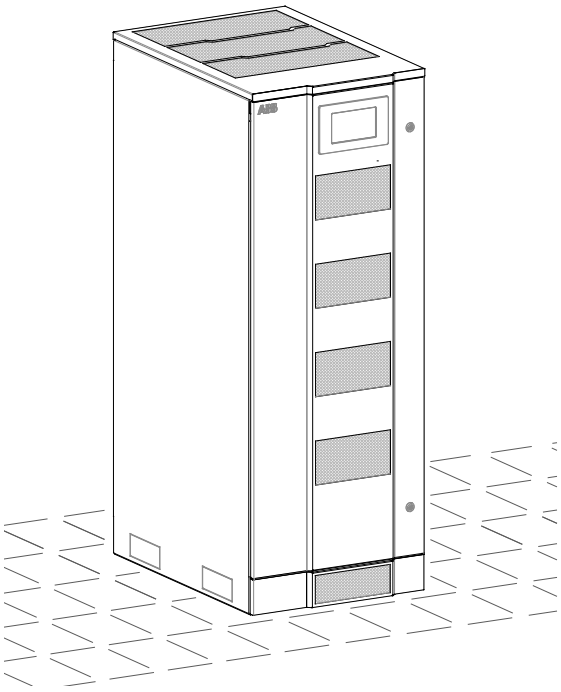
UPS TECHNICAL DATA SHEET

TLE Scalable Series

40 to 150 kVA UL S1



About this document

Document information

File name	ABB_UPS_TDS_TLE_SUL_40K_M15_1US_REV-C
UPS model	TLE Scalable Series 40 – 50 – 80 – 100 – 120 – 150 kW UL S1
Date of issue	05/15/2020
Issued by	Product Marketing
	After Sales
Checked by	R&D
Article number	4NWD005335
Document number	4NWP106197R0001
Revision	C
Revision date	02/16/2024

Contents

1 Introduction

1.1 Description

The UPS TLE Scalable Series 40 to 150 is one of the best performing three-phase UPS systems (Uninterruptible Power Supply) providing critical power protection for a wide range of applications.
The TLE Scalable Series 40 to 150 operates in double conversion mode or eco mode and has been developed to satisfy the growing request of high efficiency through an innovative control algorithm using 3-level inverter technology.
The TLE Scalable Series UPS provides industry-leading reliability, efficiency, clean input performance and unity power factor at the output with the ability to scale from 40kW to 150kW vertically.
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

RPA™

Redundant, reliable and scalable power up to 750kW thanks to the Redundant Parallel Architecture (RPA) providing redundancy of power (N+1), control and communications.

Up to 95.7% Double Conversion Efficiency and 98.9% in "SEM – Super Eco Mode", reduces energy losses minimizing cooling requirements and operating cost.

SEM Super Eco Mode

"SEM – Super Eco Mode" 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.

IGBT Rectifier

High Input Power Factor and use of an IGBT Rectifier eliminates the use of oversized input feeders and maximizes standby generator compatibility.

IGBT Inverter

High switching frequency IGBT Inverter provides best-in-class transient response and low output voltage distortion.
An output voltage waveform that closely resembles utility power.

Compact footprint

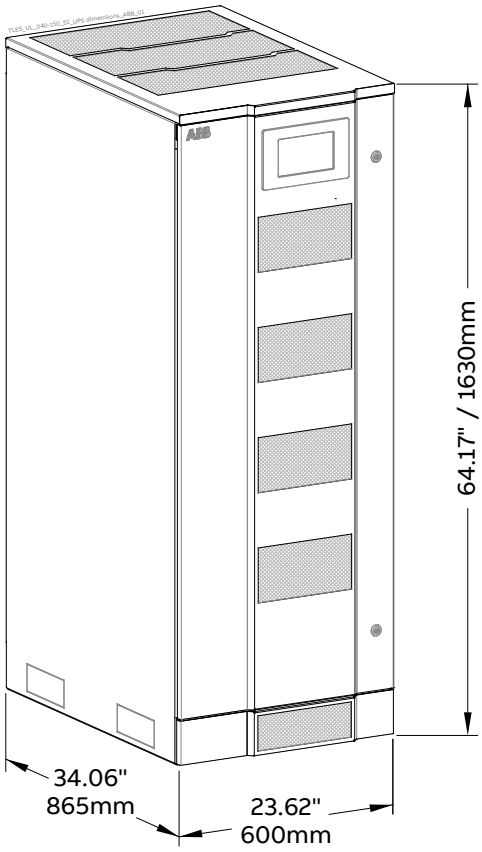
Compact footprint and low audible design, allows for use in most commercial and industrial buildings.

Scalable

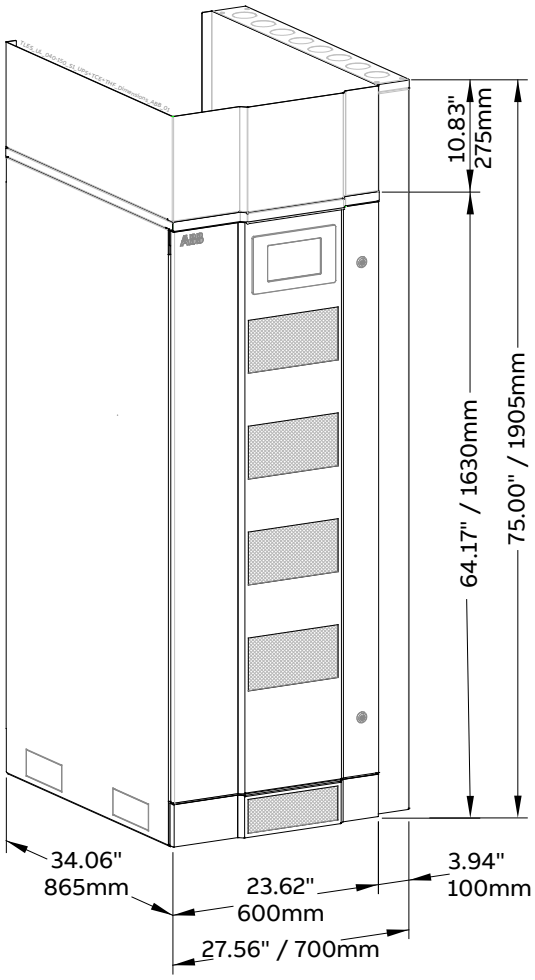
The system can be easily expanded for higher capacity and redundancy without any interruption to the critical Load or transfer to Bypass

1.3 Mechanical characteristics

TLE Scalable Series 40 to 150



TLE Scalable Series 40 to 150 with options
“TCE -Top Cable Entry” & “THF - Top Hat Fascia”



		40 & 50 kW	80 & 100 kW	120 & 150 kW
Dimensions (W x D x H)	Standard UPS	23.62 x 34.06 x 64.17“ / 600 x 865 x 1630 mm		
	UPS with “TCE” & “THF”	27.56 x 34.06 x 75.00” / 700 x 865 x 1905 mm		
Weight	Standard UPS	630 lbs 286 kg	785 lbs 356 kg	940 lbs 426 kg
	UPS with “TCE” & “THF”	740 lbs 336 kg	895 lbs 406 kg	1050 lbs 476 kg
Floor loading	Standard UPS	113 lbs/sq.ft 551 kg/m^2	141 lbs/sq.ft 686 kg/m^2	168 lbs/sq.ft 821 kg/m^2
	UPS with “TCE” & “THF”	133 lbs/sq.ft 648 kg/m^2	160 lbs/sq.ft 782 kg/m^2	188 lbs/sq.ft 917 kg/m^2

1.4 General specification

Topology	True double conversion (VFI - Voltage Frequency Independent) transformerless
Fault current rating	UPS is designed for installation in an electrical system up to 65kA
Audible noise level (at 5 ft. / 1.52 m)	< 62 dBA
Standards	UL 1778 UL marking
Access (Operator access or restricted access)	Front and top access only
Degree of protection against hazards and water ingress	IP 30 (IEC 60529 - ANSI/NEMA 60529)
Internal protection	All internal live parts shrouded
UPS frame cabinet color	RAL 9005 (black)
Transport	On pallet Cabinet suitable for handling by forklift
Installation	Minimum distance from the wall 2" / 5 cm and floor fixed
Ventilation	Forced ventilation with fan failure detection
Cable entry	Bottom at the front of the UPS cabinet or top with option "Top Cable Entry"
RPA – Redundancy Parallel Architecture	Up to 6 units for redundancy or capacity in RPA Parallel System configuration (option)
SEM – Super Eco Mode Operation	Standard

1.5 Electromagnetic compatibility

Emission	[Cat]	EN/IEC 62040-2 Category C3 (Category C2 as option)
Electrostatic discharge immunity	[kV]	4kV contact / 8kV air discharge

1.6 Environmental characteristics

Ambient operating temperature range	[° F/° C]	32 ÷ 104° F / 0 ÷ 40° C (up to 122F / 50°C subjected to conditions)
Relative humidity range	[%]	≤ 95%, non-condensing
Altitude without de-rating	[ft/m]	Up to 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 Rectifier

Rectifier bridge	Three phase, IGBT Rectifier, overtemperature protection
Standard input voltage	Nominal: 3 x 480 Vac + N Rectifier accepted ph-ph voltage range: 408 Vac ÷ 550 Vac (wider voltages subject to de-rated Loads)
Input frequency	60 Hz +/- 10% (54 ÷ 66 Hz)
Power factor	0.99
Input current THD	< 3%
Inrush current	Limited by soft-start circuit
Power walk-in	15 seconds (programmable)
Output voltage tolerance	+/- 1%
Battery voltage ripple	< 1%
Battery current ripple	Max. 5% the Battery capacity [Ah], expressed in A
Battery charging characteristic	IU (DIN 41773), T° compensated floating voltage
Battery charging current limit	Programmable

Input power data		**kW**	**40**	**50**	**80**	**100**	**120**	**150**
Input power at Inverter nominal Load and charged Battery	PF=0.9 lag.	kW	38.1	47.7	76.3	95.3	114.4	143.0
	PF=1.0 lag	kW	42.4	53.0	84.7	105.9	127.1	158.9
Max. input power at inverter nominal Load and max. Battery recharge current		kW	48.5	59.1	96.9	118.1	145.4	177.2
Standard Battery charging current at the beginning of Battery recharge at nominal Load (programmable)		A	12	12	24	24	36	36

2.2 Bypass

Input connection	Separate for Rectifier and Bypass input or common to the Rectifier input
Primary components	- Static switch (SCR) on Bypass - Electro mechanic contactors (back feed protection) on Bypass and Inverter
Voltage limits for Inverter/Bypass Load transfers	+/- 10% (adjustable)
Overload on Bypass	198A continuous 270A for 1 minute – up to 3000A for 10ms, non repetitive

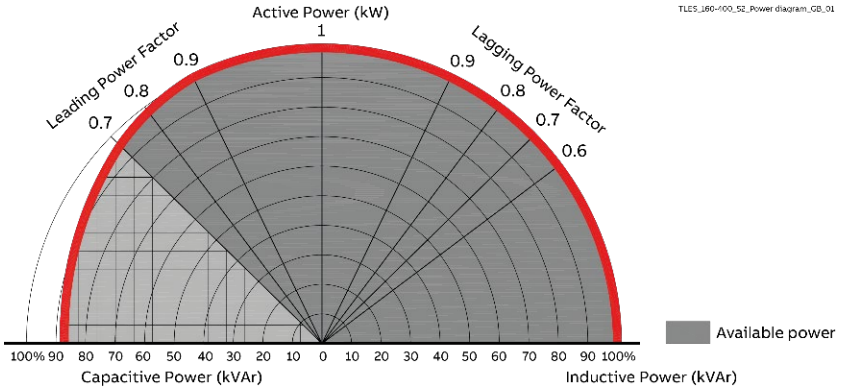
3 Output electrical characteristics

3.1 Inverter

Nominal output apparent power from PF=0.6 lag. to 0.9 lead.	[Kw]	40 - 50 - 80 - 100 - 120 - 150
Nominal output active power	[Kw]	40 - 50 - 80 - 100 - 120 - 150
Nominal output voltage (on site programmable)		3 x 480 Vac + N
Inverter bridge		Advanced Neutral Point Clamped three level IGBT technology
Output waveform		Sine wave
Output voltage tolerance:		
- Static	[%]	+/- 1
- Dynamic (at Load step 0 - 100 - 0%)	[%]	+/- 3
- Dynamic (at Load step 0 - 50 - 0%)	[%]	+/- 2
- Recovery time to +/- 1%	[ms]	< 5
- Output voltage THD for 100% linear Load	[%]	< 3
- Output voltage THD for 100% non-linear Load (EN 62040)	[ms]	< 5
Output voltage tolerance at 100% unbalanced Load (Ph-N)	[%]	+/- 3
Output frequency	[Hz]	60
Output frequency tolerance:		
- Free-running	[%]	+/- 0.1
- With mains synchronization adjustable to	[%]	+/- 4
Phase displacement:		
- At 100% balanced Load	[%]	120°: +/- 1
- At 100% unbalanced Load	[%]	120°: +/- 3
Overload capability (at 77°F / 25°C ambient temperature)		105% continuous, 110% - 10 minutes, 125% - 1 minute, 150% - 30 seconds
Short-circuit characteristic		Electronic short-circuit protection, current limit to: 2.2 times In for 100ms between phase/phase and phase/N/PE
MCCB clearance capability (selectivity)		20% In within 5-10ms (with MCCB class C or magn. trip at max. 10In)
Crest factor		>3:1

3.2 Power factor

Load power factor - rated		0.99					
Nominal output apparent power from PF=0.6 lag. to PF=0.9 lead.	[kVA]	40	50	80	100	120	150
Nominal output active power at PF=1	[kW]	40	50	80	100	120	150



Output UPS power versus power factor for:

- Inductive Loads
- Resistive Loads
- Capacitive Loads

3.3 Efficiency

		40	**50**	**80**	**100**	**120**	**150**
Efficiency at 100% Load:							
- At PF=0.9 lag. in VFI mode	[%]	95.6	95.6	95.7	95.6	95.6	95.6
- At PF= 1 in VFI mode	[%]	95.5	95.5	95.6	95.5	95.5	95.4
- At PF=1 in SEM - Super Eco Mode	[%]	98.6	98.8	98.8	98.9	98.9	98.9
Efficiency at 75% Load:							
- At PF=0.9 lag. in VFI mode	[%]	95.7	95.7	95.8	95.8	95.8	95.9
- At PF= 1 in VFI mode	[%]	95.6	95.6	95.7	95.7	95.7	95.7
- At PF=1 in SEM - Super Eco Mode	[%]	98.3	98.4	98.5	98.6	98.7	98.7
Efficiency at 50% Load:							
- At PF=0.9 lag. in VFI mode	[%]	95.2	95.6	95.6	95.7	95.7	95.9
- At PF= 1 in VFI mode	[%]	95.1	95.5	95.5	95.6	95.5	95.7
- At PF=1 in SEM - Super Eco Mode	[%]	97.7	98.0	98.2	98.3	98.4	98.4

4 Battery and energy storage

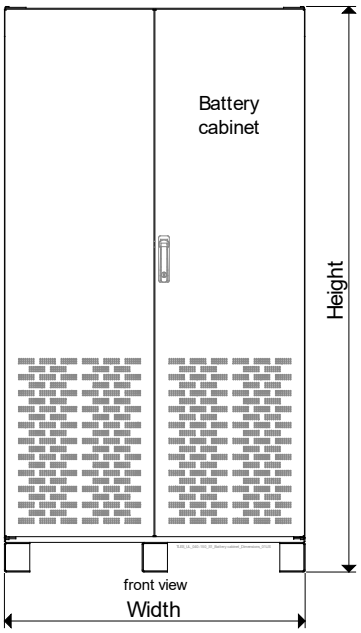
4.1 Battery technical data

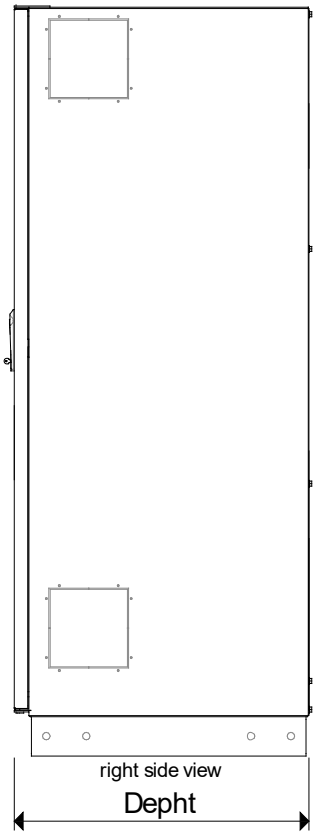
Energy storage type		No integrated Batteries, external energy storage needed. Line-and-match cabinets available as accessory					
Battery type		Valve regulated lead-acid (VRLA)-standard, Vented lead-acid, wet battery and NiCd					
Float voltage at 68°F / 20°C	[Vdc]	545 Vdc (dependent on the number of cells)					
Number of cells	[pcs]	VRLA at 2.27 Vdc/cell: 240 cells Vented lead acid at 2.23 Vdc/cell					
Minimum discharge voltage	[Vdc]	396 Vdc (adjustable)					
Recharge time	[h]	<5 hours up to 90% of Battery capacity					
Battery ground fault detection		Standard					
Automatic and manual Battery test		Standard					
Common Battery in RPA Parallel System	[u]	Up to 4 units					
Ambient operating temperature range	[° F/° C]	68 ÷ 77° F / 20 ÷ 25° C (higher the temperature, shorter the storage time of the Battery)					
Ambient storage temperature range	[° F/° C]	-4 ÷ 104° F / -20 ÷ 40° C (higher the temperature, shorter the storage time of the Battery)					
Storage time	[month]	3 months at 77° F / 25° C (higher the temperature, shorter the storage time of the Battery)					
Battery power data	[kW]	**40**	**50**	**80**	**100**	**120**	**150**
DC power at full Load and PF=0.8 lag.	[kW]	33.6	42.0	67.3	84.1	100.9	126.1
DC power at full Load and PF=1	[kW]	42.0	52.5	84.1	105.1	126.1	157.6
Maximum discharge current (1.65Vdc/cell) PF=0.8 lag.	[Amps]	85	106	170	212	255	318
Maximum discharge current (1.65Vdc/cell) PF=1	[Amps]	106	133	212	265	318	398
Matching Battery cabinets		See Section 4.2 and 6.1					

4.2 Battery cabinet technical data

❶ Cabinet dimensions (W x D x H):
29.80x29.50x75.00 inches
757 x 750 x 1905 mm

❷ Cabinet dimensions (W x D x H):
40.00 x 29.50 x 75.00 inches
1016 x 750 x 1905 mm





Battery cabinet (*)

UPS (kW)	Runtime PF = 1 (min.)	No. Batteries	No. Cabinet	Dimensions cabinet	Cabinet weight (lbs/kg)	Total Cabinet weight (lbs/kg)
40	5	40	1	❶	1180 lbs/535 kg	1180 lbs/535 kg
	8				1500 lbs/680 kg	1500 lbs/680 kg
	12				1620 lbs/735 kg	1620 lbs/735 kg
	21				2140 lbs/971 kg	2140 lbs/971 kg
	31			❷	2860 lbs/1297 kg	2860 lbs/1297 kg
	41				3220 lbs/1461 kg	3220 lbs/1461 kg
	50				3500 lbs/1588 kg	3500 lbs/1588 kg
	73				4620 lbs/2096 kg	4620 lbs/2096 kg
50	6	40	1	❶	1500 lbs/680 kg	1500 lbs/680 kg
	7				1620 lbs/735 kg	1620 lbs/735 kg
	14				2140 lbs/971 kg	2140 lbs/971 kg
	23			❷	2860 lbs/1297 kg	2860 lbs/1297 kg
	29				3220 lbs/1461 kg	3220 lbs/1461 kg
	38				3500 lbs/1588 kg	3500 lbs/1588 kg
	54				4620 lbs/2096 kg	4620 lbs/2096 kg
	58	80	2		2860 lbs/1297 kg	5720 lbs/2594 kg
	77				3220 lbs/1461 kg	6440 lbs/2922 kg
80	6	40	1	❶	2140 lbs/971 kg	2140 lbs/971 kg
	10			❷	2860 lbs/1297 kg	2860 lbs/1297 kg
	15				3220 lbs/1461 kg	3220 lbs/1461 kg
	19				3500 lbs/1588 kg	3500 lbs/1588 kg
	28				4620 lbs/2096 kg	4620 lbs/2096 kg
	31	80	2		2860 lbs/1297 kg	5720 lbs/2594 kg
	41				3220 lbs/1461 kg	6440 lbs/2922 kg
	50				3500 lbs/1588 kg	7000 lbs/3176 kg
	73				4620 lbs/2096 kg	9240 lbs/4192 kg
100	6	40	1	❷	2860 lbs/1297 kg	2860 lbs/1297 kg
	10				3220 lbs/1461 kg	3220 lbs/1461 kg
	13				3500 lbs/1588 kg	3500 lbs/1588 kg
	19				4620 lbs/2096 kg	4620 lbs/2096 kg
	22	80	2		2860 lbs/1297 kg	5720 lbs/2594 kg
	29				3220 lbs/1461 kg	6440 lbs/2922 kg
	38				3500 lbs/1588 kg	7000 lbs/3176 kg
	54				4620 lbs/2096 kg	9240 lbs/4192 kg
	63	120	3		3500 lbs/1588 kg	10500 lbs/4764 kg
120	7	40	1	❷	3220 lbs/1461 kg	3220 lbs/1461 kg
	9				3500 lbs/1588 kg	3500 lbs/1588 kg
	15				4620 lbs/2096 kg	4620 lbs/2096 kg
	17	80	2		2860 lbs/1297 kg	5720 lbs/2594 kg
	23				3220 lbs/1461 kg	6440 lbs/2922 kg
	29				3500 lbs/1588 kg	7000 lbs/3176 kg
	42				4620 lbs/2096 kg	9240 lbs/4192 kg
	50	120	3		3500 lbs/1588 kg	10500 lbs/4764 kg
	73				4620 lbs/2096 kg	13860 lbs/6288 kg
150	5	40	1	❷	3500 lbs/1588 kg	3500 lbs/1588 kg
	9				4620 lbs/2096 kg	4620 lbs/2096 kg
	12	80	2		2860 lbs/1297 kg	5720 lbs/2594 kg
	17				3220 lbs/1461 kg	6440 lbs/2922 kg
	21				3500 lbs/1588 kg	7000 lbs/3176 kg
	30				4620 lbs/2096 kg	9240 lbs/4192 kg
	38	120	3		3500 lbs/1588 kg	10500 lbs/4764 kg
	54				4620 lbs/2096 kg	13860 lbs/6288 kg
	78	160	4		4620 lbs/2096 kg	18480 lbs/8384 kg

*) For further information please consult the “Installation, Operation & Maintenance Manual” of the “Battery cabinet”

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
UVR - Battery breaker Under Voltage Release	Option, 24V, max 12W
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
Input signals	- GEN ON (emergency power supply ON, n/o contact, customer supplied) - 1 auxiliary signal, with settable functionality
3-ph SNMP/WEB plug-in Adapter	Standard
Black Box	Standard Intelligent Diagnostic

6 Options

6.1 Connectivity options

1. 3-ph SNMP/WEB plug-in Adapter
2. iUPSGuard
3. Data Protection

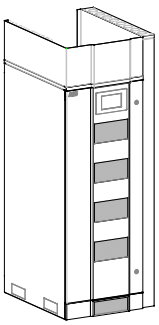
6.2 Options in UPS cabinet

1. “IEMi - Intelligent Energy Management integrated” 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
3. “IM0305 – UVR Control” board for CB3 Battery breaker box
4. Battery temperature sensor

6.3 Options in additional cabinet

1. Top Hat Fascia

   Dimensions (W x D x H): 23.62 x 34.06 x 10.83 inches /600 x 865 x 1237 mm

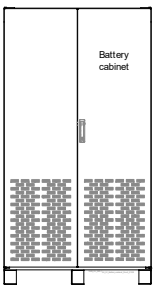


2. Top Cable Entry/Exit Sidecar

   Dimensions (W x D x H): 3.94 x 34.06 x 75.00 inches /100 x 865 x 1905 mm

3. Battery cabinet

   Dimensions (W x D x H): 29.80 x 29.50 x 75.00 inches / 757 x 750 x 1905 mm)
   40.00 x 29.50 x 75.00 inches / 1016 x 750 x 1905 mm

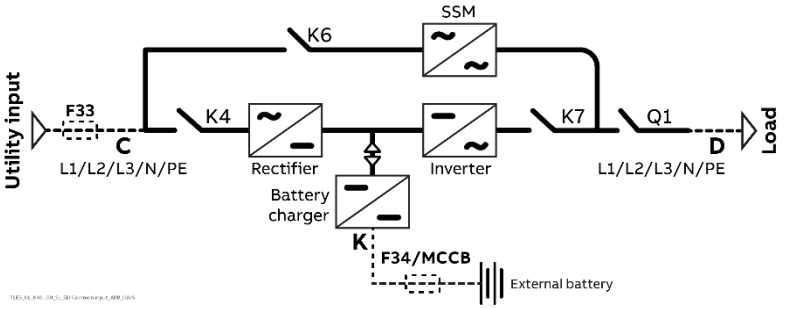


   See technical data to Section 4.2

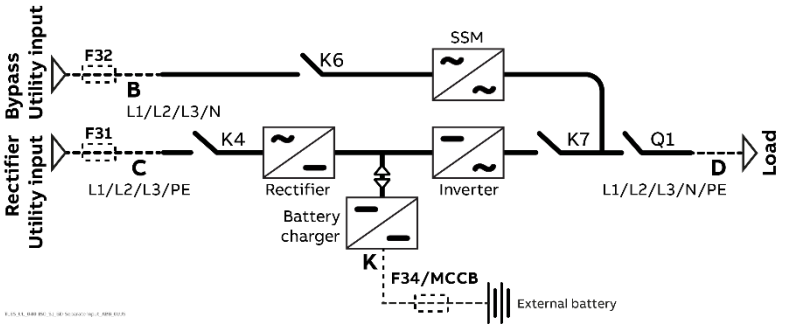
7 UPS block diagram, Line protection and cables section

7.1 Block diagram input Utility

Common Input Utility Rectifier & Bypass



Dual Input Utility Configuration Rectifier & Bypass



IMPORTANT NOTE! TLE Scalable Series 40 to 150 UL can be used as 3ph 3W, on grounded wye source

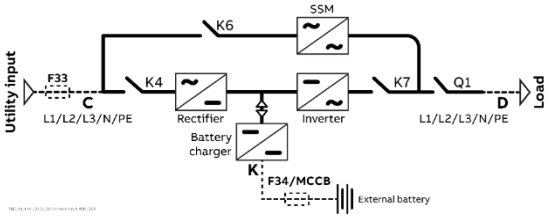
7.2 Line protection

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

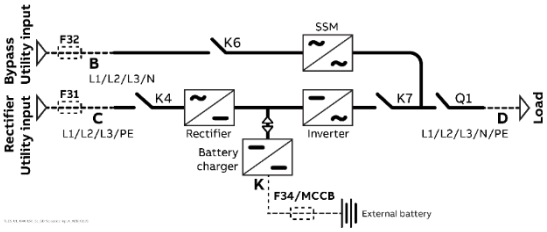
kW	F31 AC Input Rectifier	F32 AC Input Bypass	F33 AC Input	F34 / MCCB DC Input
40	80 A	60 A	80 A	110 A
50	90 A	90 A	90 A	125 A
80	175 A	175 A	175 A	200 A
100	175 A	175 A	175 A	250 A
120	225 A	200 A	225 A	300 A
150	300 A	250 A	300 A	400 A

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
40	1x AWG 2	1x AWG 4	1x AWG 1	1x AWG 4	AWG 6
50	1x AWG 1	1x AWG 1	1x AWG 1/0	1x AWG 1	AWG 6
80	1x AWG 4/0	1x AWG 4/0	1x AWG 4/0	1x AWG 3/0	AWG 4
100	1x AWG 4/0	1x AWG 4/0	2x AWG 2/0	1x AWG 4/0	AWG 4
120	2x AWG 2/0	2x AWG 1/0	2x AWG 3/0	2x AWG 1/0	AWG 4
150	2x AWG 3/0	2x AWG 3/0	2x AWG 4/0	2x AWG 3/0	AWG 3

https://library.abb.com

ABB Switzerland Ltd.
Via Luserte Sud 9
6572 Quartino
Switzerland

abb.com/ups