

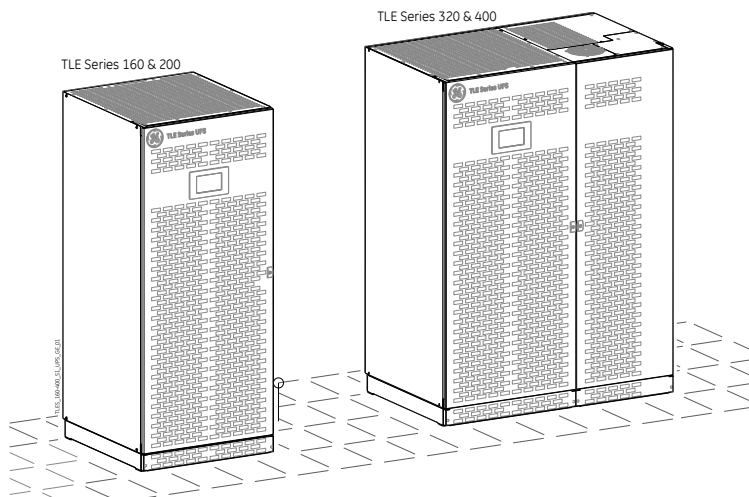
GE
Critical Power

Technical Data Sheet

Uninterruptible Power Supply

TLE Series 160 - 200 - 320 - 400

160 - 200 - 320 - 400 kVA/kW - 400 Vac CE - S1



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Model: **TLE Series 160 – 200 – 320 - 400 CE S1**

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Up-dating		
Revision	Concern	Date
2.0	CB3 notes	01.09.2013
3.0	ECN 1869 (common battery) + ECN 1945 (EAC conformity)	05.03.2014

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The illustrations and plans describing the equipment are intended as general reference only and are not necessarily complete in every detail.

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GENERAL DATA

Topology	VFI, double conversion					
Nominal output apparent power from PF=0.6 lag. to PF=0.9 lead.	kVA	160	200	320	400	
Nominal output active power at PF=1	kW	160	200	320	400	
Efficiency at 100% load PF=0.9 lag. / 1 in VFI & PF=1 in eBoost	% ¹⁾	VFI eBoost	96.5 / 96.1 98.7	96.2 / 96.0 98.8	96.6 / 96.2 98.7	96.3 / 96.1 98.8
Efficiency at 75% load PF=0.9 lag. / 1 in VFI & PF=1 in eBoost	% ¹⁾	VFI eBoost	96.5 / 96.2 98.6	96.5 / 96.2 98.7	96.6 / 96.4 98.6	96.6 / 96.4 98.7
Efficiency at 50% load PF=0.9 lag. / 1 in VFI & PF=1 in eBoost	% ¹⁾	VFI eBoost	96.2 / 95.9 98.2	96.5 / 96.2 98.3	96.3 / 96.2 98.2	96.6 / 96.4 98.3
Audible noise level	dB(A)	74				
Battery type	Valve regulated lead-acid (VRLA), vented lead-acid, NiCd					
Operating temperature range	UPS: 0°C ÷ 40°C					
Storage temperature range	UPS: -25°C ÷ +55°C	Battery: -20°C ÷ +40°C (higher the temperature, shorter the storage time of the battery)				
Relative Humidity	Max. 95% (non-condensing)					
Max. altitude without power derating	1000m					
Power derating (according to EN/IEC 62040-3)	1500m: -2.5% / 2000m: -5% / 2500m: -7.5% / 3000m: -10%					
Protection degree	IP 20 (IEC 60529)					
Standards	EN/IEC 62040, CE marking					
EMC (Electromagnetic Compatibility)	EN/IEC 62040-2 (Category C2 as option - only for 160 & 200 kVA)					
Electrostatic discharge immunity	4kV contact / 8kV air discharge					
Internal protection	All internal live parts shrouded					
Transport	Cabinet suitable for handling by forklift					
Colour	RAL 9005 (black)					
Installation	Can be positioned against a wall and floor fixed					
Service access	Front and top access only					
External cable connections	Bottom at front of the cabinet. Top: 160 & 200 as option / 320 & 400 standard					
Cooling	Enforced ventilation with fan failure detection and fan speed regulation					
Paralleling (RPA version)	Up to 6 units for redundancy or capacity in RPA configuration (option)					

RECTIFIER

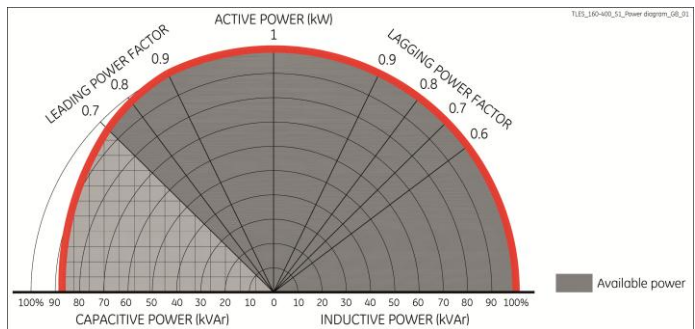
Rectifier bridge	Three phase, IGBT rectifier, overtemperature protection				
Standard input voltage	Nominal: 3 x 400V + N Programmable: 3 x 380 / 415V + N Rectifier accepted ph-ph voltage range: 340V ÷ 460V ²⁾				
Other input voltages	On request				
Input frequency	50/60 Hz +/-10% (45 ÷ 66 Hz)				
Power factor	0.99				
Input current THD	<3%				
Inrush current	Limited by soft-start circuit				
Power walk-in	15 seconds				
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		kVA	160	200	320	400
Input power at inverter nominal load and charged battery	at PF=0.9 lag.	kW	150.0	187.5	300.0	375.0
	at PF=1.0 lag.	kW	166.7	208.3	333.3	416.7
Max. input power at inverter nominal load and max. battery recharge current		kW	191.6	233.3	382.7	466.5
Max. battery charging current (programmable) at the beginning of battery recharge at nominal load		A	45	45	90	90

UPS OUTPUT POWER CAPABILITY

Output UPS power versus power factor for:

- Inductive loads
- Resistive loads
- Capacitive loads



¹⁾ Tolerance ±0.3%

²⁾ Battery recharging is not ensured below 370V when running at full load

BATTERY					
Battery type	Valve regulated lead-acid (VRLA)-standard, Vented lead-acid, wet battery and NiCd				
Float voltage at 20°C	545V ÷ 600V (dependent on the number of cells)				
Number of cells	VRLA at 2.27V/cell: 240÷264 cells Vented lead acid at 2.23V/cell, no boostcharge: 244÷264 cells				
Min. discharge voltage (programmable)	396V (dependent on the number of cells)				
Recharge time	<5 hours up to 90% of battery capacity				
"Battery to earth" fault detection	Standard				
Automatic and manual battery test	Standard				
Common battery in parallel system	Up to 3 units				
Battery power data	kVA	160	200	320	400
DC power at full load & PF=0.8 lag. / PF=0.9 lag. / PF=1	kW	131 / 147 / 163	163 / 184 / 204	261 / 294 / 327	327 / 367 / 408
Matching battery cabinets	See option features on page 5				

INVERTER	
Nominal output apparent power from PF=0.6 lag. to 0.9 lead.	160 – 200 – 320 - 400 kVA
Nominal output active power	160 – 200 – 320 - 400 kW
Nominal output voltage (on site programmable)	3 x 380V / 400V / 415V + 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%	<5 ms
- output voltage THD for 100% linear load	<2.5%
- output voltage THD for 100% non-linear load (EN 62040)	<5%
Output voltage tolerance at 100% unbalanced load (Ph-N)	+/- 3%
Output frequency	50/60 Hz (selectable)
Output frequency tolerance:	
- free-running	+/- 0.1%
- with mains synchronisation adjustable to	+/- 4%
Phase displacement:	
- at 100% balanced load	120°: +/- 1%
- at 100% unbalanced load	120°: +/- 1%
Overload capability (at 25°C ambient temperature)	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

EBOOST™ OPERATION MODE (OPTION)			
eBoost Operation Mode characteristics (option)	Output waveform		Continuously monitored
	Inverter reaction time	ms	<2 (typical)
	Steady-State RMS tolerance	Vrms	+/- 10
Transfer limits in eBoost Operation Mode (option)	Instantaneous voltage distortion (w.r.t. normal sine wave)	Magnitude	Vp
		Duration	us
	Steady-State frequency tolerance		Hz
	Instantaneous phase shift		rad

BYPASS	
Input connection	Separate for rectifier and bypass input or common to the rectifier input (option)
Primary components	- Static switch (SCR) on bypass - Electromechanic contactors (backfeed protection) on bypass and inverter - 2 manual switches for maintenance bypass
Voltage limits for inverter/bypass load transfers	+/- 10% (adjustable)
Overload on bypass	150% for 1 minute & 22 times In for 10ms, non repetitive – 110% continuous

INTERFACING	
RS232 serial port	Standard
EPO - EMERGENCY POWER OFF (n/c contact, customer supplied)	Standard
Customer Interface board	Standard
6 programmable signalling voltage-free contacts	- Standard information for easy integration and signalling - 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

Note: all indicated values are typical. Variations may be found from one unit to another.

FRONT PANEL CONTROLS, SIGNALS AND ALARMS



The control panel, positioned on the UPS front door, acts as the UPS user interface and comprises of the following elements:

- Back lit Graphic Display (LCD) Touch Screen with the following characteristics:
 - Multilanguage communication interface: English, German, Italian, Spanish, French, Finnish, Polish, Portuguese, Czech, Slovakian, Chinese, Swedish, Russian and Dutch;
 - Graphic diagram indicating UPS status.
- Command keys and parameters setting.
- UPS status control LED.

OPTIONS

COMMUNICATION OPTIONS:

1. Additional Customer Interface Card
2. 3-ph SNMP/WEB plug-in Adapter
3. iUPS Guard
4. GE Data Protection

BUILT-IN UPS OPTIONS:

1. eBoost™ Operation Mode
2. RPA kit (Redundant Parallel Architecture)
3. Kit for common input mains
4. Auxiliary Power Supply (APS) 24Vdc
5. Surge suppressors

OPTIONS IN ADDITIONAL CABINETS:

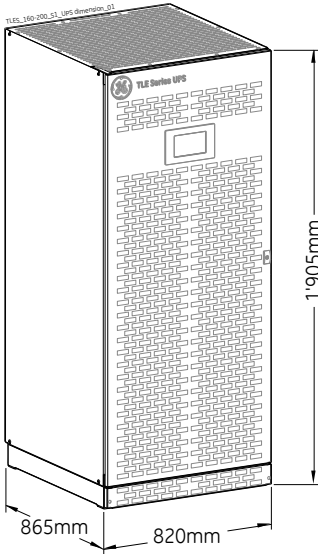
Dimensions (WxDxH): ❶ 300x865x1905mm ❷ 600x865x1905mm ❸ 870x865x1905mm ❹ 1120x865x1905mm

- | | |
|--|--|
| 1. Rectifier or bypass or UPS input transformer | ❸ 160 & 200 kVA / ❹ 320 & 400 kVA |
| 2. Top entry cables cabinet | ❶ 160 & 200 kVA / standard for 320 & 400 kVA |
| 3. EMC filter EN/IEC 62040-2 Category C2 (Class A) | ❷ 160 & 200 kVA |
| 4. CB3 Battery disconnect box | 685 x 415 x 870 |
| 5. Special voltages: input and/or output | On request |
| 6. Empty battery cabinets | ❹ |
| 7. Battery cabinet 1x75Ah | ❹ |
| 8. Battery cabinet 2x50Ah | ❹ |

EXTERNAL ACCESSORIES:

- | | |
|--|------------|
| 1. Parallel output cabinet with centralized maintenance bypass | On request |
| 2. Battery fuses box | On request |

TECHNICAL DATA

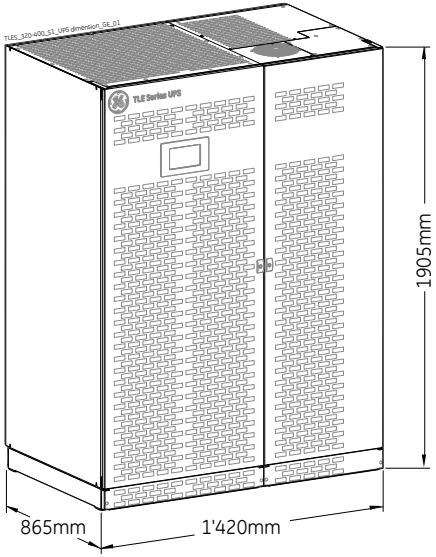


TLE Series 160 & 200

Dimensions (WxDxH):
820 x 865 x 1905 mm

WEIGHTS (kg)

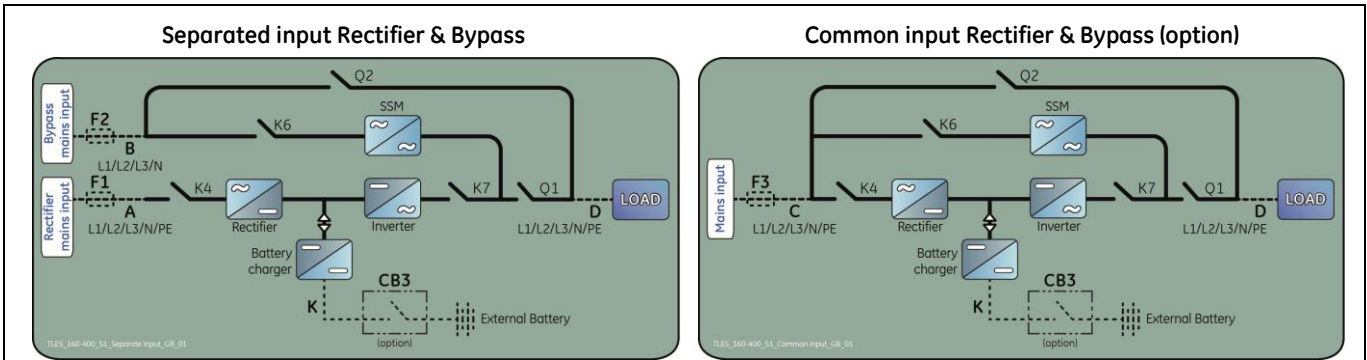
UPS Rating (kVA)	UPS cabinet		Built-in UPS options
	UPS standard	Floor loading UPS standard (kg/m ²)	eBoost™ Operation Mode
160 & 200	500	705	30
320 & 400	980	798	75



TLE Series 320 & 400

Dimensions (WxDxH):
1420 x 865 x 1905 mm

UPS BLOCK DIAGRAM, PROTECTIONS AND CABLE SECTIONS



Line protections and cable sections								
kVA	Protections for mains voltages 3 x 380V / 400V / 415 Vac			Battery protection 500 Vdc (Max. 240 cels) ¹⁾	Cable sections (mm ²) recommended by European Standards Alternatively, local standards to be respected			
	F1	F2	F3	CB3	A	B	C & D	K
160	3 x 250A	3 x 250A	3 x 250A	FKN36NTN630PF / 500A ²⁾	3x120+70	4x120	4x120+70	2x(2x120)+120
200	3 x 315A	3 x 315A	3 x 315A	FKN36NTN630PF / 630A ²⁾	3x150+95	4x150	4x150+95	2x(2x150)+150
320	3 x 500A	3 x 500A	3 x 500A	FKN36NTN800PF / 800A ²⁾	3x(2x120)+120	4x(2x120)	4x(2x120)+120	2x(2x240)+240
400	3 x 630A	3 x 630A	3 x 630A	FKN36NT100SF / 1000A ²⁾	3x(2x150)+150	4x(2x150)	4x(2x150)+150	2x(4x120)+2x120

¹⁾ for higher cells use device fuse or breaker with suitable Vdc rating

²⁾ setting value: Ir – overload protection

F1, F2, F3, CB3, A, B, C, D, (K): supplied by customer

K: supplied by GE only with battery

CB3: can be supplied by GE

Cable sections recommended in Switzerland (mm ²)				
kVA	A	B	C & D	K
160	3x150+95	4x150	4x150+95	2x(2x150)+150
200	3x185+95	4x185	4x185+95	2x(2x185)+185
320	3x(2x150)+150	4x(2x150)	4x(2x150)+150	2x(3x185)+2x150
400	3x(2x185)+185	4x(2x185)	4x(2x185)+185	2x(4x150)+2x150

IMPORTANT NOTE !

The UPS is designed for TN System. The input neutral shall be grounded at source and shall never be disconnected. 4 pole breaker shall not be used at the UPS input (see also IEC 60364-1, IEC 61140, IEC 61557).