

DC UPS


RTB.e
50-1000 A
**3 phase rectifier
battery chargers**
Input voltage:

400 Vac, 3-phase, 50/60 Hz

Output voltage:

24/48/110/220 Vdc

RMB.e/RCB.e
50-100-150 A
**1 and 3 phase
compact rectifier
battery chargers**
Input voltage:

 220/230/240 Vac, 1-phase,
 50/60 Hz (RMB.e)
 400 Vac, 3-phase (RCB.e)

Output voltage:

24/48/110/220 Vdc


IRB-3 kVA
1 phase - DC/AC inverters

Inverters

IMB.e/ITB.e
5-200 kVA
**1 and 3 phase
DC/AC inverters**
Input voltage:

110/125/220 Vdc

Output voltage:

 115/120/230 Vac,
 1-phase (IMB.e)
 208/400/480 Vac,
 3-phase (ITB.e)

E2001.e/E3001.e
5-200 kVA
**3/1 and 3/3 phase
on-line double
conversion UPS**
Input voltage:

208/400/480 Vac, 3-phase

Output voltage:

 115/120/230 Vac,
 1-phase (E2001.e),
 208/400/480 Vac,
 3-phase (E3001.e)

Battery voltage:

110/125/220 Vdc



AC UPS

RMB.e/RCB.e/RTB.e

Features and benefits

- Input transformer for AC-DC galvanic separation
- SCR rectifier, overvoltage, undervoltage protection for reliable operation in all mains conditions
- Soft-start for start-up overcurrent limitation
- Support all charging methods for vented/sealed lead acid batteries and Ni-Cd batteries
- Adjustable manual and automatic charging mode for maximum flexibility on operation
- Standard configurations, for cost-effective and short lead time solutions
- High personalization grade
- Front accessibility for easy maintenance
- 16-bit microprocessor control for best-in-class performance and reliability
- Digital control panel and mimic display for signals, alarms, meters and history events continuous monitoring
- Comprehensive set of communication options for total remote monitoring of equipment operation
- Small size design for easy installation and minimum space requirements (RMB.e/RCB.e)
- Parallel operation for redundancy requirements
- Natural cooling on most of range (RTB.e).

Main options

- AC surge protection
- Built-in battery breaker
- Timer-controlled battery charging
- Battery voltage temperature compensation
- DC earth fault monitoring and alarm
- Fan monitoring and alarm
- Associated cabinets for batteries, distribution boards, dropping cells or DC/DC chopper converters.

Extra options

- Block diode for parallel operation
- Battery on racks or inside cabinets
- Dedicated buttons and selectors for battery charge functions
- Control logic redundant supply
- Protection degree up to IP41



RMB.e and RCB.e technical data

Rating (A)	50 *	100	150 (RCB.e only)			
Input						
Nominal voltage	230 Vac 1-phase (RMB.e) or 400 Vac 3-phase (RCB.e) ±10%					
Frequency	50/60 Hz ±5 Hz					
Output						
Nominal voltage	24/48/110/Vdc, 220 Vdc only for RCB.e					
Operating voltage	Floating: 2.27 (VRLA), 2.2÷2.3 (VLA), 1.4÷1.5 (Ni-Cd) V/cell adjustable Boost: 2.4÷2.45 (VLA), 1.5÷1.65 (Ni-Cd) V/cell adjustable Equalizing: up to 2.35 (VRLA), up to 2.7 (VLA), up to 1.7 (Ni-Cd) V/cell adjustable					
Static voltage regulation	±1%					
Voltage ripple	≤1%					
Overload capacity	<120% for 20 min; <150% for 2 min; >150% for 20 s					
Charging characteristic	IU (according to DIN 41773), I ₁ I ₂ U, U ₁ U ₂ I					
System and environmental						
Isolation	Input/output					
Dimensions WxHxD (mm)	550x1300x550					
Weight (kg)	Product weights vary with output rated current and voltage (see the table below)					
Rating	50		100		150	
	RMB.e	RCB.e	RMB.e	RCB.e	RCB.e	
Output voltage	24 Vdc	80	90	90	100	110
	48 Vdc	90	100	100	115	135
	110 Vdc	100	115	110	145	175
	220 Vdc	-	150	-	180	240
Cooling	Forced ventilation					
Colour	RAL 7035					
Protection degree (IEC 60529)	IP21 (option up to IP41)					
Operating temperature	-10 °C ÷ +40 °C					
Storage temperature	-20 °C ÷ +70 °C					
Altitude	<2000 m (derating according to EN 62040-3)					
Audible noise at 1 meter (dBA)	<65					
Options	Associated battery cabinets; matching cabinets for distribution and dropping cells; built-in battery breaker; external battery breakers in standard or Eex-d wall-mounted box; battery thermal probe; block diode for parallel; earth fault alarm; fan monitoring and alarm; control logic redundant supply					
User Interface						
Front panel	LCD display with 4x LED set, mimic and keyboard					
Connectivity (optional)	up to 2 SPDT contact relay cards, RS232 serial port, RS485 ModBus-RTU serial port, ModBus to PROFIBUS DP adapter, Ethernet SNMP/WEB adapter, remote monitoring software					

* 25A size available only for RMB.e (more details on request)

Extra options

- Customized input and output voltage
- 12 pulse bridge for harmonics reduction
- Additional RFI and THD filters
- Dual branch redundancy (with block diode or load sharing)
- Top cable entry
- Space heaters and panel lighting
- Analogue meters and lamps on front panel
- Customisable status and alarm LED set
- Special painting and protection degree up to IP54
- Ambient temperature up to +55 °C



System configuration example

RTB.e technical data

Rating (A)	50	100	150	200	300	400	500	600	800	1000	
Input											
Nominal voltage	400 Vac 3-phase ±10%										
Frequency	50/60 Hz ±5%										
Input THDi	27% 6p, 12% 12p, 6% THD filter +12p										
Output											
Nominal voltage	24/48/110/220 Vdc										
Operating voltage	Floating: 2.27 (VRLA), 2.2÷2.3 (VLA), 1.4÷1.5 (Ni-Cd) V/cell adjustable Boost: 2.4÷2.45 (VLA), 1.5÷1.65 (Ni-Cd) V/cell adjustable Equalizing: up to 2.35 (VRLA), up to 2.7 (VLA), up to 1.7 (Ni-Cd) V/cell adjustable										
Static voltage regulation	±1%										
Voltage ripple	≤1%										
Overload capacity	<120% for 20 min; <150% for 2 min; >150% for 20 s										
Charging characteristic	IU (according to DIN 41773), I ₁ I ₂ U, U ₁ U ₂ I										
System and environmental											
Isolation	Input/output										
Dimensions WxD (mm)	Height is 2100 mm, width and depth vary with output rated current and voltage (see the table below)										
Rating	50	100	150	200	300	400	500	600	800	1000	
Output voltage	24 Vdc	600x800	600x800	600x800	600x800	600x800	800x800	800x800	800x800	800x800	1000x800
	48 Vdc	600x800	600x800	600x800	600x800	800x800	800x800	800x800	1000x800	1000x800	1000x800
	110 Vdc	600x800	600x800	600x800	600x800	800x800	800x800	1000x800	1000x800	1000x1000	1000x1000
	220 Vdc	600x800	600x800	800x800	800x800	800x800	1000x800	1200x1000	1000x800	1000x1000	1000x1000
Maximum weight (kg)	330	460	550	630	750	870	970	1050	1350	1500	
Cooling	Natural							Forced ventilation			
Efficiency	93%										
Colour	RAL 7035										
Protection degree (IEC 60529)	IP20 (other options)										
Operating temperature	-10 °C ÷ +40 °C										
Storage temperature	-20 °C ÷ +70 °C										
Altitude	<2000 m (derating according to EN 62040-3)										
Audible noise at 1 meter (dBA)	<65÷70										
Options	Associated battery cabinets; associated distribution panels and dropping cells or DC/DC chopper converters; built-in battery breaker; external battery breakers in standard or Ex-d battery protection box; battery thermal probe; block diode or electronic load sharing for parallel; earth fault alarm; fan monitoring and alarm.										
User Interface											
Front panel	LCD display, LED mimic, keyboard. Customisable status and alarms LED set										
Connectivity	SPDT contact relay card Optional: RS232 serial port, RS485 Modbus-RTU serial ports, ModBus to PROFIBUS DP adapter, Ethernet SNMP/WEB adapter, remote monitoring software, up to 2 additional SPDT contact relay cards										

IMB.e/ITB.e

Features and benefits

- Built-in inverter transformer for DC-AC galvanic separation
- IGBT, PWM controlled inverter for high efficiency and low output THD
- Standard configurations, for cost-effective and short lead time solutions
- High personalization grade
- Front accessibility for easy maintenance
- 16-bit microprocessor control for best-in-class performance and reliability
- Digital control panel and mimic display, for signals, alarms, meters and history events continuous monitoring
- Comprehensive set of communication options for total remote monitoring of equipment operation.

Main options

- Bypass line isolation transformer & AC/AC voltage regulator
- Additional RFI filters
- Customized input and output voltage
- Active parallel redundant, hot-standby and load-sync configuration
- Fan monitoring, alarm and redundant ventilation
- Top cable entry
- Space heaters and panel lighting
- Analogue meters and lamps on front panel for immediate visualisation
- Customisable status and alarm LED set
- Special painting and protection degree up to IP54
- Ambient temperature up to +55 °C.

Extra options

- Associated cabinets for AC distribution boards
- AC earth fault monitoring and alarm



IMB.e technical data

Rating (kVA)	5	10	15	20	30	40	50	5	10	15	20	30	40	50	60	80	100	
Nominal power (kW)	4	8	12	16	24	32	40	4	8	12	16	24	32	40	48	64	80	
Input																		
DC input voltage	110 Vdc (90÷160 Vdc range)								220 Vdc (180÷300 Vdc range)									
Bypass input voltage	110/115/120 or 220/230/240 Vac 1-phase ±20% (adjustable according to inverter output voltage)																	
Output																		
Nominal voltage	110/115/120/220/230/240 Vac 1-phase																	
Frequency	50/60 Hz (selectable)																	
Voltage regulation	±1% static; ±5% dynamic (80% load change), <40 ms recovery time																	
Overload capacity	125% for 10 min; 150% for 1 min; 200% for 100 ms																	
Harmonic Distortion THDv	<2% linear load; <5% non-linear load																	
System																		
Isolation	Battery to load isolation included; input/output isolation available with additional bypass transformer																	
Dimensions WxD (mm)	Height is 2100 mm, width and depth vary with output rated power and voltage (see the table below)																	
	Rating	5	10	15	20	30	40	50	5	10	15	20	30	40	50	60	80	100*
Output voltage	110÷120 Vac	600x800		800x800		1000x800		600x800		800x800		1000x800		1400x800				
	220÷240 Vac	600x800		800x800		1000x800		600x800		800x800		1000x800		1400x800				
Maximum weight (kg)	320	360	400	440	500	550	610	320	360	400	440	470	500	550	600	730	830	
Cooling	Forced ventilation																	
Efficiency	94%																	
Colour	RAL 7035																	
Protection degree (IEC 60529)	IP20 (other options)																	

IRB Rackmount Solution



IRB technical data

Rating (kVA/kW)	3/2.4
DC input voltage	110 Vdc (88-160 Vdc range)
Nominal output voltage and frequency	230 Vac 50Hz
Voltage regulation	± 1% dynamic 100% load change, <5% ms recovery time
Overload capacity	150% indefinitely (4.5kVA)
Harmonic Distortion THDv	<1% linear load; <5% non-linear load
Isolation	Battery to load
Dimensions wxhxd (mm)	482,6 x 177 x 482,6 (4U in 19" rack)
Weight (kg)	27.5
Cooling	Forced ventilation
Heat dissipation @ nominal	350W
Colour	RAL7035
Protection degree (IEC60529)	IP20
Front panel	LCD display, LED mimic, keyboard
Connectivity	SPDT contact relay card, RS232 serial port, RS485 Modbus-RTU port, USB port.

ITB.e technical data

Rating (kVA)	5	10	15	20	30	40	50	60	80	100	120	160	200
Nominal power (kW)	4	8	12	16	24	32	40	48	64	80	96	128	160

Input	
DC input voltage	available input DC voltages vary with requested output AC voltages and rating (see the table below)

Output voltage	200÷220 Vac	110 Vdc (90÷160 Vdc range) 220 Vdc (180÷300 Vdc range)	-
	380÷415 Vac	110 Vdc (90÷160 Vdc range) 220 Vdc (180÷300 Vdc range)	220 Vdc (180÷300 Vdc range)

Bypass input voltage	200/208/220 or 380/400/415 Vac 3-phase ±20% (adjustable according to inverter output voltage)
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Output	
Nominal voltage	200/208/220/380/400/415 (optional 480) Vac 3-phase
Frequency	50/60 Hz (selectable)
Voltage regulation	±1% static; ±5% dynamic (80% load change), <40 ms recovery time
Overload capacity	125% for 10 min; 150% for 1 min; 200% for 100 ms
Harmonic Distortion THDv	<2% linear load; <5% non-linear load

System	
Isolation	Battery to load isolation included; input/output isolation available with additional bypass transformer

Dimensions WxD (mm)	Height is 2100 mm, width and depth vary with input voltage and rating (see the table below)
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Rating	5	10	15	20	30	40	50	60	80	100	120	160	200
Input voltage	110 Vdc	600x800			800x800			800x800* 100x800"	100x800	1000x1000	1400x1000	-	
	220 Vdc	600x800				600x800* 800x800"	800x800			800x800* 1000x800"	1000x800	1000x1000	1400x1000

Maximum weight (kg)	325	370	415	450	520	570	640	690	750	850	880	920	1020
Cooling	Forced ventilation												
Efficiency	94%												
Colour	RAL 7035												
Protection degree (IEC 60529)	IP20 (other options)												

* 400 Vac " 208 Vac

IMB.e and ITB.e technical data

Environmental	
Operating temperature	-10 °C ÷ +40 °C
Storage temperature	-20 °C ÷ +70 °C
Altitude	<2000 m (derating according to EN 62040-3)
Audible noise at 1 meter (dBA)	<65±75
Options	
Associated distribution panels; emergency line isolation transformer and AC/AC voltage stabilizer; parallel redundant, hot-standby, load-sync configuration; earth fault alarm; fan monitoring and alarm; redundant ventilation; additional RFI filters; top cable entry.	
User Interface	
Front panel	LCD display, LED mimic, keyboard. Customisable status and alarms LED set
Connectivity	SPDT contact relay card, RS232 serial port Optional: RS485 ModBus-RTU serial port, ModBus to PROFIBUS DP adapter, Ethernet SNMP/WEB adapter, remote monitoring software, up to 2 additional SPDT contact relay cards.

Higher ratings on request

E2001.e/E3001.e

Extra options

- Built-in battery breaker
- Battery voltage temperature compensation
- Timer-controlled battery charging
- 12 pulse bridge for harmonics reduction
- Additional THD filters
- AC & DC earth fault monitoring and alarm
- Associated cabinets for batteries, AC & DC distribution boards and dropping cells or DC/DC chopper converters
- External battery breakers in standard or Eex-d (up to 800 A) wall-mounted box



System configuration example

AC UPS

E2001.e technical data

Rating (kVA)	5	10	15	20	30	40	50	5	10	15	20	30	40	50	60	80	100
Nominal power (kW)	4	8	12	16	24	32	40	4	8	12	16	24	32	40	48	64	80
Input																	
Input voltage	380/400/415 (optional 208/480) Vac 3-phase ±10%, 50/60 Hz ±10%																
Input THDi	27% 6p, 12% 12p, 6% THD filter + 12p																
Bypass input voltage	110/115/120 or 220/230/240 Vac 1-phase ±20% (adjustable according to inverter output voltage)																
Battery																	
DC voltage	110 Vdc (90÷160 Vdc range)								220 Vdc (180÷300 Vdc range)								
Operating battery voltage	Floating: 2.27 (VRLA), 2.2÷2.3 (VLA), 1.4÷1.5 (Ni-Cd) V/cell adjustable Boost: 2.4÷2.45 (VLA), 1.5÷1.65 (Ni-Cd) V/cell adjustable Equalizing: up to 2.35 (VRLA), up to 2.7 (VLA), up to 1.7 (Ni-Cd) V/cell adjustable																
Output																	
Nominal voltage	110/115/120/220/230/240 Vac 1-phase																
Frequency	50/60 Hz (selectable), ±0.001 Hz free running, ±2 Hz synchronized with mains																
Voltage regulation	±1% static; ±5% dynamic (80% load change), <40 ms recovery time																
Overload capacity	125% for 10 min; 150% for 1 min; 200% for 100 ms																
Harmonic Distortion THDv	<2% linear load; <5% non-linear load																
System																	
Isolation	Floating battery; input/output isolation available with additional bypass transformer.																
Dimensions W (mm)	Height is 2100 mm, depth is 800 mm, width varies with output voltage range and rating (see the table below)																
Rating	5	10	15	20	30	40	50	5	10	15	20	30	40	50	60	80	100
Output voltage	110÷120 Vac	800		1400		1800		800			1200	1400		1600	1800	2400	
	220÷240 Vac	800		1400		1800		800			1200		1400		1600	1800	
Maximum weight (kg)	450	500	600	650	820	900	1000	460	520	620	670	750	850	950	1150	1250	1400
Cooling	Forced ventilation																
Efficiency	88%																
Colour	RAL 7035																
Protection degree (IEC 60529)	IP20 (other options)																

E3001.e technical data

Rating (kVA)	5	10	15	20	30	40	50	60	80	100	120	160	200
Nominal power (kW)	4	8	12	16	24	32	40	48	64	80	96	128	160

Input	
Input voltage	380/400/415 (optional 208/480) Vac 3-phase $\pm 10\%$, 50/60 Hz $\pm 10\%$
Input THDi	27% 6p, 12% 12p, 6% THD filter +12p
Bypass input voltage	200/208/220 or 380/400/415 (optional 480) Vac $\pm 20\%$ (adjustable according to inverter output voltage)

Battery	
DC voltage	available DC bus voltages vary with requested output AC voltages and rating (see the table below)
Output voltage	200÷220 Vac 110 Vdc (90÷160 Vdc range) 220 Vdc (180÷300 Vdc range)
	380÷415 Vac 110 Vdc (90÷160 Vdc range) 220 Vdc (180÷300 Vdc range)
Operating battery voltage	Floating: 2.27 (VRLA), 2.2÷2.3 (VLA), 1.4÷1.5 (Ni-Cd) V/cell adjustable Boost: 2.4÷2.45 (VLA), 1.5÷1.65 (Ni-Cd) V/cell adjustable Equalizing: up to 2.35 (VRLA), up to 2.7 (VLA), up to 1.7 (Ni-Cd) V/cell adjustable

Output	
Nominal voltage	200/208/220/380/400/415 (optional 480) Vac 3-phase
Frequency	50/60 Hz (selectable), ± 0.001 Hz free running, ± 2 Hz synchronized with mains
Voltage regulation	$\pm 1\%$ static; $\pm 5\%$ dynamic (80% load change), <40 ms recovery time
Overload capacity	125% for 10 min; 150% for 1 min; 200% for 100 ms
Harmonic Distortion THDv	<2% linear load; <5% non-linear load

System	
Isolation	Floating battery; input/output isolation available with additional bypass transformer
Dimensions WxD (mm)	Height is 2100 mm, width and depth vary with input voltage and rating (see the table below)

Rating (kVA)	5	10	15	20	30	40	50	60	80	100	120	160	200
Input voltage	110 Vdc	800x800		1400x800		1600x800		2000 x800	2000 x1000	2400 x1000	.	.	.
	220 Vdc	800x800		1200 x800	1400 x800*	1400x800		1600 x800	2400 /1600 x800	2400 x800	2000 x800	2000 x1000	2400 x1000
Maximum weight (kg)	460	520	620	670	750	850	950	1150	1250	1400	1520	1680	1970
Cooling	Forced ventilation												
Efficiency	88%												
Colour	RAL 7035												
Protection degree (IEC 60529)	IP20 (other options)												

* 208 Vac ~400 Vac

E2001.e and E3001.e technical data

Environmental	
Operating temperature	-10 °C ÷ +40 °C
Storage temperature	-20 °C ÷ +70 °C
Altitude	<2000 m (derating according to EN 62040-3)
Audible noise at 1meter (dBA)	<65÷75

Options Associated battery cabinets and distribution panels; bypass isolation transformer and AC/AC voltage stabilizer; 12 pulse bridge; THD filters; built-in battery breaker; timed battery charging; external battery breakers in standard or Eex-d wall-mounted box; battery thermal probe; parallel redundant, hot-standby, load-sync; AC and DC earth fault alarm; fan monitoring and alarm; redundant ventilation; additional RFI filters; top cable entry

User Interface	
Front panel	LCD display, LED mimic, keyboard. Customisable status and alarms LED set
Connectivity	SPDT contact relay card, RS232 serial port Optional: RS485 ModBus-RTU serial port, ModBus to PROFIBUS DP adapter, Ethernet SNMP/WEB adapter, remote monitoring software, up to 2 additional SPDT contact relay cards

Higher ratings on request

E2001.e/E3001.e

Features and benefits

- Built-in inverter transformer for DC-AC galvanic separation
- IGBT, PWM controlled inverter for high efficiency and low output THD
- Support vented/sealed lead acid batteries and Ni-Cd batteries
- Standard configurations for cost-effective, short lead time solutions
- High personalization grade
- Front accessibility for easy maintenance
- 16-bit microprocessor control for best-in-class performance and reliability
- Digital control panel and mimic display, for signals, alarms, meters and history events continuous monitoring
- Comprehensive set of communication options for total remote monitoring of equipment operation
- Input transformer protected by MCCB for AC-DC galvanic separation and SCR rectifier for reliable operation in all mains conditions.

Main options

- Bypass line isolation transformer & AC/AC voltage regulator
- Additional RFI filters
- Customized input and output voltage
- Active parallel redundant, hot-standby and load-sync configuration
- AC earth fault monitoring and alarm
- Fan monitoring and alarm and redundant ventilation
- Top cable entry
- Space heaters and panel lighting
- Analogue meters and lamps on front panel for immediate visualisation
- Customisable status and alarm LED set
- Special painting and protection degree up to IP54
- Ambient temperature up to +55 °C.

Special options for DC and AC UPS batteries

- **Energy recovery battery discharger** providing a controlled discharge into the AC mains for efficiency test and load upgrade simulation. Discharge characteristic can be set at constant current, constant power or according to custom profiles. Energy recovery battery discharger is available as an option on RTB.e, E2001.e and E3001.e.
- **Battery monitoring system** allowing real time prediction of lead acid and Ni-Cd batteries potential failure modes, thus reducing maintenance and replacement costs. The system performs string currents and temperature tests on each battery block or cell, actual capacity check and data logging. A manual battery test mode is also included. Remote access over RS485 ModBus is available as an option.



Who we are

Borri is a company specialized in custom design, manufacturing and servicing of power electronics equipment for ICT, industrial, oil & gas and energy applications. Borri's R&D department is one of the most complete regarding the different disciplines in the field of power conversion. Long experience in semiconductors and magnetic component design is combined with the most advanced digital regulation algorithms and microcontroller programming know-how. Borri has a leading position in the oil and gas market thanks to its proven customizing expertise and continuous pursuit of excellence in a state-of-the-art product. However, wide experience in several branches of power electronics such as UPS systems for data centers and inverters for renewable energy and storage, make Borri a leader in this technology not only for oil and gas applications. The latest patented three-phase solution based on its green conversion operation can guarantee the best PUE for green data centers: proof of the ongoing company commitment to innovation. Based in Italy with 12,000 m² production space and a large full-testing area, the company can call on more than 80 years of experience. Borri has a strong global presence and is represented in all 5 continents where it can provide on-site service and technical support.

Standards and certifications

- **Marking**
CE
- **Safety**
IEC EN 50178, IEC EN 62040-1
- **EMC**
IEC EN 61000-6-2, IEC EN 61000-6-4,
IEC EN 62040-2
- **Test and performance**
IEC EN 62040-3
- **Quality, environment, health and safety**
ISO 9001:2008, ISO 14001:2004,
GOST, BS OHSAS 18001:2007

