NEW PRODUCT ANNOUNCEMENT 09 June 2008

RT 20 Series Industrial UPS Systems

Single Phase and Three Phase

The new RT 20 series of standard industrial duty UPS systems is announced by Borri Power Systems Limited.

Borri Power Systems Limited was established in England in 1988 and is no newcomer to the UK market or the process industries and industrial applications for UPS systems. The rugged transistor “RT series” of UPS systems have been designed, built and installed in industrial applications over the past 20 years, in particular for the continuity of production processes and for industrial plant automation and control.

The new series RT 20 UPS systems replaces the earlier generation series 2000 products that have provided reliable service in numerous chemical and petrochemical installations, in steel and general metal production plants, glassworks, pulp and paper mills, textile and food plants, publishing, health care and in telecommunication and defence applications.

The RT20 UPS systems can be supplied with 6 pulse rectifiers or with 12 pulse rectifiers, the pulse width modulation (PWM) inverter section uses the Semikron Skiip well proven IGBT power stages. The inverter bridges can be configured a single phase output from 10kVA up to 150kVA, the three phase inverters are supplied from 10kVA to 400kVA. The output is galvanically separated from the load by means of an integral output isolation transformer. The output is delivered via a static interrupter cross coupled with a similar continuously rated static switching module for transferring the critical load to the bypass. This product, unlike some competitors offering does not use the questionable reliablity electromechanical contactor on the inverter output.

The control logic is sectioned so the rectifier, inverter and bypass elements can be operated separately so the UPS system can start and run without the batteries connected, the inverter can also “black start” from batteries, the rectifier can charge the batteries with the inverter and bypass switched off.

The control logic is mounted face forward on a hinged open safety screen shield full height inner door accessed only when the front door is fully opened. This provides excellent access for inspection and fault finding without the need for extender cards or for the logic cards to withdrawn from an enclosure box

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The RT20 series UPS systems may be operated in the classic redundant parallel configuration with up to 6 modules synchronised together sharing equally the connected load. The standard metering is by a keypad operated digital display and there is a built in data logger and event recorder and a data output port for remote status indication and monitoring.

A power flow status indicating mimic panel mounted on the front door provides clear audible and visual alarm indication and provides remote alarm signalling by means of an interface printed circuit board.

The RT 20 series UPS systems can be used with VRLA batteries, vented lead acid batteries and NiCd batteries, the standard battery bus voltage is 384v DC but 220V and 120V battery voltages are available as alternative options.

This series of UPS systems use the latest IGBT power semiconductor devices and the commutating frequency used is the optimum to achieve good efficiency, low thermal stress, excellent life expectancy and reliability. The RT20 products are quiet in operation, the design is compact and all features are well laid out.

Good thermal dissipation control of heat from the heat sinks is achieved by using integral low velocity, low noise fans without the need for installing the large, high velocity noisy fans in the top of the enclosure as employed on competitors' products.

The product is easy to install and commission and has and many other characteristics that make RT UPS systems ideal for use in industrial location as well as in computer room environments.
Many installations have been made in industrial, banking and university sites, in offices of many public utilities and private companies and they have been used in numerous applications supporting new technology demands in automation, broadcasting ,control & instrumentation, communication, defence, avionics and navigation aids.

In addition to UPS systems from 10kVA to 400kVA for industrial applications, we offer a wide range other products:

- **Inverters**
- **Rectifiers**
- **Frequency Converters 50Hz/60Hz 50Hz/400Hz**
- **Mains Static Transfer Switches since 4kVA to 600kVA**
- **Rectifiers for cathodic protection**

Further information from:

Bernard Wallace,

Managing Director

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RT 20 INPUT 3Ph - OUTPUT 3Ph TECHNICAL CHARACTERISTICS

Configuration :

- Fully controlled 6 pulse thyristor rectifier and battery charger with overall current limit and separate current limit for battery charging for all types of batteries, 12 pulse option available
- Inverter advanced PWM type using IGBT semiconductor devices with galvanic isolation output transformer.
- Inverter static interrupter cross coupled to static bypass.
- Static bypass transfer switch with manual maintenance bypass switch.
- Status indicating and alarm indicating mimic panel with digital metering(5).
- Remote alarm and status indication interface module.
- Modular steel frame enclosure with hinged front doors and removable side, rear and top panels.

TYPE	2010	2015	2020	2030	2040	2060	2080	2120	2160	2200	2250	2300	2400
INPUT													
Voltage	400V 3Ph+N +10%												
Frequency	50-60Hz ±5%												
Power factor at mains voltage and full load (cosφ)	0.8						0.84						
Nominal power absorbed with battery in floating charge	11.5 kVA	17 kVA	23 kVA	34 kVA	45 kVA	67 kVA	90 kVA	125 kVA	167 kVA	208 kVA	260 kVA	312 kVA	416 kVA
Max power absorbed with battery in boost charge	14.5 kVA	21.5 kVA	29 kVA	43 kVA	56 kVA	84 kVA	112 kVA	168 kVA	224 kVA	280k VA	350 kVA	420 kVA	560 kVA
Soft start	10 sec.												
OUTPUT													
Wave shape	Sinusoidal												
Frequency	choice 50 or 60Hz												
Frequency stability without synchronism	± 0.2%												
Range of frequency stability with synchronism	±2% - ±4% preset												
Synchronization speed	0.1Hz/sec												
Voltage	400Vac 3Ph + N												
Voltage adjustment	± 5%												
Voltage stability	± 1%												
Recovery time in static conditions range	10 msec												
Voltage dynamic stability with load 0-100%	± 5%												
Phase voltage asymmetry with balanced load	1%												
Phase voltage asymmetry with 100%unbalanced load	< 2.5%												
Voltage phase displacement with balanced load	120° ±1 electrical degree												
Voltage phase displacement with unbalanced load	. 120° ± electrical degrees												
Voltage distortion with linear load	≤ 3%												
Voltage output distortion with non linear load (crest factor=3)	≤ 5%												

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High-speed output fuseways	Max 0.2 In for output way

RT 20 INPUT 3Ph - OUTPUT 3Ph TECHNICAL CHARACTERISTICS

TYPE	2010	2015	2020	2030	2040	2060	2080	2120	2160	2200	2250	2300	2400
CHARACTERISTICS													
Power supplied (power factor = 0.8)	10 kVA	15 kVA	20 kVA	30 kVA	40 kVA	60 kVA	80 kVA	120 kVA	160 kVA	200 kVA	250 kVA	300 kVA	400 kVA
Power overload (power factor = 0.8)	125% Pn for 10min - 150% Pn for 10sec												
3ph short circuit current	150% In for 10sec												
1ph short circuit current	200% In for 10sec												
Current overload with load supplied by emergency mains	10xIn for 100msec												
Non linear load with crest factor = 3	100% Pn												
DC CIRCUIT													
Operating voltage	320 Vdc ÷ 460 Vdc												
No. lead acid cells	192												
Floating charge voltage	432 Vdc (2.25 Vdc / cell)												
Boost charge voltage	460 Vdc (2.4 Vdc / cell)												
End discharge voltage	320 Vdc (1.66 Vdc / cell)												
Prealarm threshold	Adjustable												
Max manual charge voltage (with nominal mains voltage and inverter off)	480 Vdc (2.5 Vdc / cell)												
Rectifier voltage stability with load 0-100%	± 1%												
Rectifier max current	28A	41A	55.6A	82A	110A	163A	220A	326A	430A	535A	680A	805A	1090A
Ripple (without battery)	1%												
Recharge period	1 to 14 hours – adjustable within limits												
Nominal recharge	0.1 C/10h												
Recharge characteristics	Constant current/constant voltage “I-U” DIN n. 41772												
Inverter current absorbed with min. voltage	28A	41A	55.6A	82A	110A	163A	220A	326A	430A	535A	680A	805A	1090A
Static Bypass SWITCHING													
Voltage dynamic threshold for inverter-emergency mains switching	Settable												
Inverter-emergency mains with inverter in synchronism: switching time	O sec. (instantaneous)												
Inverter-emergency mains with inverter not in synchronism : switching time	20 msec												

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RT 20 INPUT 3Ph - OUTPUT 3Ph TECHNICAL CHARACTERISTICS

TYPE	2010	2015	2020	2030	2040	2060	2080	2120	2160	2200	2250	2300	2400
Emergency mains-inverter with mains in synchronism : switching time	O sec. (instantaneous)												
Emergency mains-inverter with mains not in synchronism: switching time	5 msec												
Overload current from emergency mains for 100 msec.	10xIn												
OVERALL EFFICIENCY													
Load 25%	84%	84.5%	85%	85.5%	86%	86.5%	90%	90%	91%	91.2%	91.5%	92%	92.1%
Load 50%	89%	89.5%	90%	90.5%	91%	91.5%	92.4%	92.6%	92.8%	93%	93.3%	94%	94.2%
Load 75%	89.8%	90%	90.3%	90.5%	91%	91.5%	92.4%	92.6%	92.8%	93%	93.3%	94%	94.2%
Load 100%	88%	88.5%	89%	89.5%	90%	90.5%	91.5%	91.7%	91.7%	92%	92.3%	93%	93.2%
No load losses	0.35 kW	0.45 kW	0.55 kW	0.9 kW	1 kW	1.4 kW	2 kW	2.8 kW	3.4 kW	3.9 kW	5 kW	6 kW	8 kW
MECHANICALS AND OTHERS													
Ingress protection	IP20 (also with door open)												
. UPS cabinet dimensions mm. (WxDxH)	680x600x1400			750x800x1500			840x 800x 1685	1250x800x 1685		2090x 800x 1685	2090x 800x 1800	2090x840x 1800	
Peso UPS Kg. / UPS weight kg.	260	280	300	360	500	610	750	980	1250	1500	1600	1850	2200
Noise level	< 53 dBA				< 60 dBA		< 63 dBA						
Operating temperature	0°C ÷ 40°C												
Storage temperature	- 25°C ÷ 70°C												
Relative humidity	95% at 25°C												
Max altitude	1000 m a.s.l.												
Battery	VRLA/vented lead-acid/ Nickel-cadmium												
Construction	EN 50091/1 EMC EN50091-2 Liv.A												
Colour	RAL 1013												

NOTES:

1. Float voltage refers to VRLA batteries as example for data calculations only.
2. At max auto boost charge voltage for vented lead acid batteries with input mains not less than -5%.
3. An optional mains balancing isolation transformer will be necessary to convert 3 phase input to single phase output in the bypass circuit otherwise when the single phase load is transferred to the bypass the “R” phase carrying the bypass load current would create a serious unbalanced loading on the upstream DB protection.
4. Typical 27% with 6 pulse fully controlled thyristor bridge rectifiers. We can supply optional filters or 12 pulse rectifiers to reduce to less than 10% the total harmonic distortion reflected into the input mains source.
5. Optional isolation input transformer available. Supplementary metering available.
6. Batteries enclosures available in style to match the appearance of the UPS system.
7. Other colours available on request.

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- Modular steel frame enclosure with hinged front doors and removable side, rear and top panels.

RT 20 INPUT 3Ph - OUTPUT 1Ph TECHNICAL CHARACTERISTICS

TYPE	2010	2015	2020	2030	2040
INPUT					
Voltage	400V 3F+N +10% / 400V 3Ph+N +10%				
Frequency	50-60Hz ±5%				
Power factor at mains voltage and full load (cosφ)	0.8				
Nominal power absorbed with battery in floating charge	11.5kVA	17kVA	23kVA	34kVA	45kVA
Max power absorbed with battery in boost charge	14.5kVA	21.5kVA	29kVA	43kVA	56kVA
Soft start	10 sec.				
OUTPUT					
Wave shape	Sinusoidal				
Frequency	choice 50 or 60Hz				
Frequency stability without synchronism	± 0.2%				
Range of frequency stability with synchronism	±2% - ±4% preset				
Synchronization speed	0.1Hz/sec				
Voltage	230Vac				
Voltage adjustment	± 5%				
Voltage stability	± 1%				
Recovery time in static conditions range	10 msec				
Voltage dynamic stability with load 0-100%	± 5%				
Voltage distortion with linear load	≤ 3%				
Voltage output distortion with non linear load (crest factor=3)	≤ 5%				
High-speed output fuseways	Max 0.2 In for output way				
CHARACTERISTICS					
Power supplied (power factor = 0.8)	10kVA	15kVA	20kVA	30kVA	40kVA

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Power overload (power factor = 0.8)	125% Pn for 10MIN - 150% Pn for 10sec.	
Short circuit current	200% In for 10sec.	150% In for 10sec.

RT 20 INPUT 3Ph - OUTPUT 1Ph TECHNICAL CHARACTERISTICS

TYPE	2010	2015	2020	2030	2040
Current overload with load supplied by emergency mains	10xIn for 100msec.				
Non linear load with crest factor = 3	100% Pn				
DC CIRCUIT					
Operating voltage	320Vdc-460Vdc				
No. lead acid cells	192				
Floating charge voltage	432Vdc (2.25Vdc / cell)				
Boost charge voltage	460Vdc (2.4Vdc / cell)				
End discharge voltage	320Vdc (1.66Vdc / cell)				
Prealarm threshold	adjustable				
Max manual charge voltage (with nominal mains voltage and inverter off)	480Vdc (2.5Vdc / cell)				
Rectifier voltage stability with load 0-100%	± 1%				
Rectifier max current	28A	41A	55.6A	82A	110A
Ripple (without battery)	1%				
Recharge period	1 to 14 hours - adjustable within limits				
Nominal recharge current	0.1 C/10h				
Recharge characteristics	Constant current / constant voltage “I-U” DIN 41772				
Inverter current absorbed with min. voltage	28A	41A	55.6A	82A	110A
Static Bypass SWITCHING					
Voltage dynamic threshold for inverter-emergency mains switching	Settable				
Inverter-emergency mains with inverter in synchronism: switching time	0 sec. (instantaneous)				
Inverter-emergency mains with inverter not in synchronism: switching time	20 msec				
Emergency mains-inverter with mains in synchronism: switching time	0 sec. (instantaneous)				
Emergency mains-inverter with mains not in synchronism: switching time	5 msec				

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RT 20 INPUT 3Ph - OUTPUT 1Ph TECHNICAL CHARACTERISTICS

TYPE	2010	2015	2020	2030	2040
Overload current from emergency mains for 100 msec.	10xIn				
OVERALL EFFICIENCY					
Load 25%	84%	84.5%	85%	85.5%	86%
Load 50%	89%	89.5%	90%	90.5%	91%
Load 75%	89.8%	90%	90.3%	90.5%	91%
Load 100%	88%	88.5%	89%	89.5%	90%
No load losses	0.35kW	0.45Kw	0.55kW	0.9kW	1kW
MECHANICALS AND OTHERS					
Ingress protection	IP20 (even with door open)				
UPS cabinet dimensions mm. (WxDxH)	680x600x1400			750x800x1500	
UPS weight kg.	260	280	300	360	500
Noise level	< 53 dBA				< 60 dBA
Operating temperature	0°C ÷ 40°C				
Storage temperature	- 25°C ÷ 70°C				
Relative humidity	95% a 25°C				
Max altitude	1000 m. a.s.l.				
Battery	VRLA / vented lead-acid / Nickel-Cadmium				
Construction	EN 50091/1 EMC EN50091-2 Liv.A				
Colour	RAL 1013				

NOTES:

1. Float voltage refers to VRLA batteries as example for data calculations only.
2. At max auto boost charge voltage for vented lead acid batteries with input mains not less than -5%.
3. An optional mains balancing isolation transformer will be necessary to convert 3 phase input to single phase output in the bypass circuit otherwise when the single phase load is transferred to the bypass the “R” phase carrying the bypass load current would create a serious unbalanced loading on the upstream DB protection.
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