

PowerPro™ EF300 Series

Three Phase Input & Output Online Transformerless UPS
10kVA – 600kVA (Parallelable up to 4.8mVA)

- » Eco-Friendly
- » Intelligent
- » Space Saving

VFI



The PowerPro Eco-Friendly 300 Series UPS is a combination of BPC's advanced Digital Signal Processor (DSP) control technology and a firm pursuit of a green manufacturing philosophy, resulting in a UPS design utilising the latest generation power components and improved conversion circuit topology in order to optimise maximum efficiency.

With minimum space, fewer components and controlled levels of noise pollution, it has a significantly reduced environmental impact. Therefore, with the Eco-Friendly UPS range it is feasible to design a UPS with reduced carbon footprint whilst achieving clean, continuous power for industrial and computing applications.

- » Data Centres
- » Financial services
- » Healthcare
- » Industrial
- » Telecommunications

PowerPro EF Range

PowerPro EF 300C Series 10kVA – 30kVA



EF 300 Compact Features

- Compact space saving design
- 3 level rectifier / 3L inverter topology
- 0.9 output power factor (unity available 10 20kVA) 0.8 output power factor on 30kVA model
- Advanced backlit display
- Low THDi / high input power factor / high efficiency up to 94%
- Higher DC AC efficiency for smaller battery designs
- Selectable input/output voltage/frequency range

PowerPro EF 300R Series 10kVA – 100kVA 250kVA – 400kVA



EF 300R Features

- 3 level rectifier / 3L inverter topology
- 0.9 output power factor (unity available)
- Advanced backlit display
- Low THDi / high input power factor / high efficiency up to 95%
- Selectable input/output voltage/frequency range
- Parallelable up to 8 units
- Increased reliability due to DSP design control

PowerPro EF 300XU Series 100kVA – 400kVA



EF 300XU Features

- 3 level rectifier / 3L inverter topology
- Unity output power factor as standard
- Advanced TFT touch screen display
- Low THDi / high input power factor / high efficiency up to 96%
- Selectable input/output voltage/frequency range
- Parallelable up to 8 units
- Changing colour logo display depending on operational state
- High inverter AC/DC efficiency
- Compact model which provides market leading high energy density with high power density output

PowerPro EF 300TR Transformer Series 10kVA – 600kVA



EF 300TR Features

- Galvanic isolation on the inverter output
- 3 level rectifier / 3L inverter topology
- 0.9 output power factor
- Advanced backlit display
- Selectable input/output voltage/frequency range
- Parallelable up to 8 units
- Suitable for harsh industrial environments

PowerPro EF 300LIFT Series 2.7kVA – 23kVA



EF LIFT Features

- A unique combination of the EF300R series and intelligent regenerative load braking system
- Designed to meet BS 9999 Annex G specification
- 3 level rectifier / 3L inverter topology
- 0.9 output power factor (unity available)
- ECO mode function required
- Low THDi / high input power factor
- High efficiency over 98%

PowerPro EF Features

MODULAR DSP ARCHITECTURE

The PowerPro EF300 Range is designed with internal DSP architecture, with separate DSP for Rectifier, Inverter and display. With the use of a CAN Bus System, other modules can be added easily to update or configure the system for multiple use design.

The modular DSP design future proofs your UPS:

- Latest features can be easily upgraded
- Multiple applications for Lifts, Medical, Solar.

INCREASED RELIABILITY

PowerPro EF300R/ EF300TR/ EF300XU series are designed to allow connectivity in parallel of up to 8 units, providing a total power capacity of 4.8 mVA. The system can also be configured to provide N + 1 redundancy offering the highest reliability. This flexibility allows you to install a system that can grow with your business power requirements.



ADVANCED COMMUNICATIONS

The PowerPro EF300 Range comes with internal and external SNMP options with full environmental features.

- Four fully programmable dry port relays as standard upgradable to twelve, with over 65 selectable alarms on the EF300R, EF300XU, EF300TR & EF300 LIFT ranges option to upgrade to 12 port card
- Three fully programmable dry port relays as standard upgradable to twelve, with over 65 selectable alarms on the EF300 Compact Series.
- Dedicated communication port for service engineer diagnosis and adjustment via laptop or notepad on the EF300R, EF300XU, EF300TR & EF300 LIFT ranges
- Emergency Power Off (EPO) connection for external switching control for the entire EF300 range.

INTELLIGENT BATTERY MANAGEMENT & PROTECTION

- Internal batteries in standard chassis up to 80kVA
- Deep discharge protection
- Low AC ripple
- Interactive external battery circuit breaker position sensing - optional
- Interactive battery circuit breaker control - optional
- Two stage battery self test, a short test and an intensive test with adjustable test intervals
- Adjustable battery charger system for short and long runtimes
- Optional external temperature compensation on the EF300R, EF300XU, EF300TR & EF300 LIFT ranges.



PowerPro EF Features

LOW RUNNING COSTS

The PowerPro EF300 Series operates with low Total Harmonic Distortion (THDi) to less than 5% at full load. The low harmonics help to reduce overheating of input transformers and prevents over sizing input cables and protection devices.

The input power factor of the system runs close to unity at full load, helping to reduce operating costs from utility suppliers charging premium rates.

The low THDi and close to unity power factor mean better matching of generators and reduced costs due to oversizing.

FLEXIBILITY

A fully protected system with the flexibility to meet all demands:

- Multiple operating modes including Online and ECO Mode
- Frequency converter with standard 50 Hz Input, adjustable output to 60 Hz.
- Adjustable 'walk in' time for generator friendly operation
- Dual feed inputs – separately feeding both the Rectifier and bypass lines
- Cold Start Feature – start up with no mains available.
- Input and output transformer options
- All major parameters, such as bypass synchronisation are fully programmable

SPACE SAVING DESIGN

The PowerPro EF300 Series has been designed with class leading power density, maximising valuable floor space in your data centre. The range boasts small footprints of 0.32m² up to 30kVA, 0.44m² up to 160kVA, 0.68m² up to 250kVA and 0.97m² up to 500kVA.

HARSH ENVIRONMENTS

Some applications can have severe surroundings where higher internal protection might be required.

The PowerPro EF300 Series can be offered with IP31 or IP42 options (others on request) to safeguard against unstable environments where the need to counter ingress of harmful particles and liquids is essential.



ADVANCED GRAPHIC DISPLAY

A precise graphic backlit display providing real time status and parameter readings via its own DSP controller. The EF home screen shows all modular elements of the UPS in a clear and precise manner as well as an overview of the system operation.

An easy to navigate control pad allows for a complete and comprehensive overview of measurements, controls and settings with comprehensive event logging up to 192 event memory record system (total 7000 alarms or warnings).

INTELLIGENT MANAGEMENT & MAINTENANCE SYSTEM

The PowerPro EF300 Series has the most advanced built in management and maintenance system (MMS). The MMS has dynamic self-diagnostics and analyses all the internal sub assemblies, providing the engineer with recommendations on what settings need adjustment and calibration.

Fast PCB replacement with all settings and adjustments are easily uploaded via the engineer's laptop. The MMS system built into the UPS reduces the mean time to repair (MTTR) by almost half compared to other UPS systems.

Four service meters track critical areas within the UPS alerting that maintenance is required.



2x 80kVA High
Internal Protection
IP42 UPS supporting
residential lifts in the
UK

POWERPRO EF MEDICAL

The PowerPro EF300 MEDICAL range has been specially developed to use on MRI Scanners and medical environments.

With specifically designed DSP software, the EF MEDICAL provides better operation against MRI loads that have transformers at their input.

The MEDICAL UPS also has better operation against short circuits and provides higher current inrush capacity to prevent problems caused by IGBT saturation.

The system has the capability to accommodate an Internal Galvanic Isolation Transformer up to 60kVA whilst systems up to 600kVA have the Isolation Transformer provided in a matching battery cabinet design.

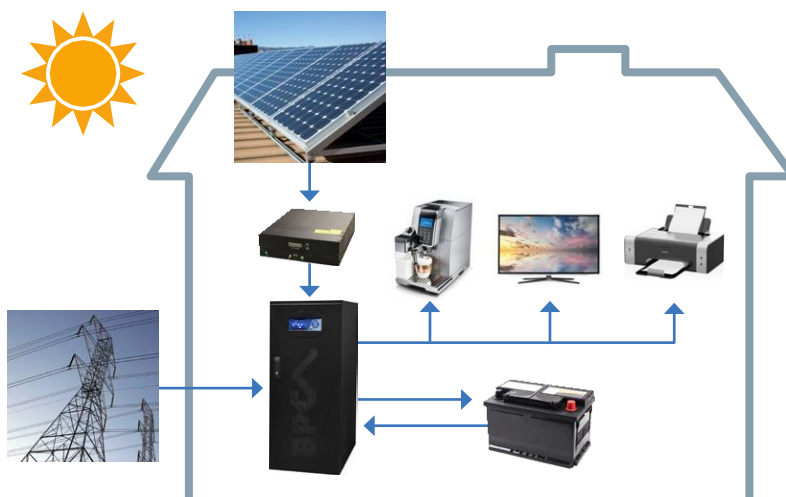


POWERPRO EF HYBRID

The PowerPro EF300 HYBRID range senses the availability of solar power, grid power and the battery power for supplying connected loads, using the most economical and ecological combination of these energy sources. The system primarily works from solar energy to return your investment.

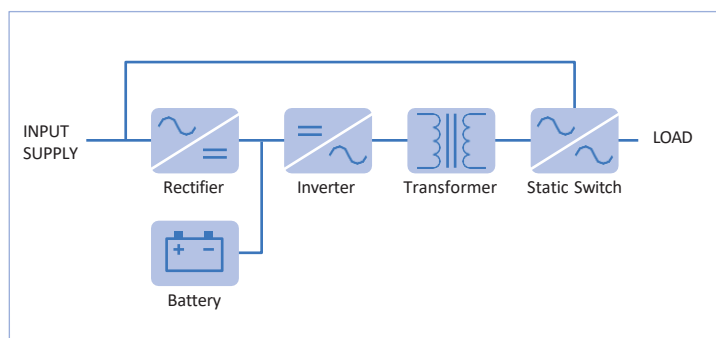
MPPT algorithm provides maximum energy available in the PV panels to the load connected at the output of the solar converter which arranges power redundancy automatically.

The battery bank stores the unused clean energy and protects against power failures.



POWERPRO EF 300TR

The PowerPro EF300TR series completes the range offering a UPS incorporating galvanic isolation on the output of the inverter. This technology enables complete galvanic isolation between the DC bus and the output to the loads to ensure power continuity. The series is available from 10kVA to 600kVA, providing a solution for any application.





PowerPro EF300 Compact Series

Three Phase Input & Output Online Transformerless UPS 10kVA – 30kVA

Technical Specification

MODEL	EF310C	EF315C	EF320C	EF330C
Power Rating kVA / kW	10 / 9	15 / 13.5	20 / 18	30 / 24
INPUT				
Voltage	380 / 400 Vac 3P + N + G ± 20% (415 Vac + 15%, -25% optional)			
Frequency	50 Hz / 60 Hz ±5%			
Power Factor (at 100% load)	≥0.99			
THD (at 100% load)	≤4% (depends on mains input conditions)			
By-pass Voltage	380 / 400 Vac 3P + N, 4 wires, ± 10%			
Protection	Fuses, Voltage & Frequency Tolerance			
OUTPUT				
Power Factor	0.9			0.8
Voltage	380/400 VAC 3P + N + G ± 1% (415 VAC optional)			
Frequency	50 Hz / 60 Hz			
Frequency Tolerance	Line synchronized: ± 2% / Free running ± 0.1%			
Efficiency (at 100% load)	90%			
Crest Factor	3:1			
Overload Protection	100% - 125% load: 10 min, 125% - 150% load: 1min, - >150% load: by pass			
Protection	Fuses, Advanced short circuit, Voltage tolerance, DC balance, Regenerative load, Current limiting			
Voltage THD	≤2% (at 100% linear load)			
BATTERIES				
Number Battery / Type	60 (± 30) batteries (Internal battery options available)			
Float Charging Voltage	± 405 VDC (adjustable)			
End of Discharge Voltage	± 300 VDC (adjustable)			
Battery Protection	3 level alarms, Battery fuses, Charging current limit, Temperature compensation (optional)			
Automatic Battery Test	Standard: Every 72 hours (adjustable)			
GENERAL				
Advanced	Self diagnostics, 3 maintenance time indicators, Calibration over RS232, Operating hour meter			
Communication	RS232 Serial port, 4 standard DRY contact alarm relays			
Protection	Power module over temperature, Over current, Temperature high alarms / IP21			
Operating Temperature / Relative Humidity / Altitude	0°C - 40°C / 90% max. (non condensing) / >1000m above sea level			
Acoustic Noise	>55dBA	>57dBA		
Dimensions (mm) WxDxH	300 x 770 x 700 (without battery)			
Weight (kg)	47.5	49.5	51	55
MODEL (with attached battery cab)	EF310CBC9	EF315CBC9	EF320CBC9	EF330CBC9
Dimensions (mm) WxDxH	300 x 800 x 1170 (up to 9ah battery)			
Weight (kg)	75	77	83	83
Comms. Adaptors Optional	SNMP, MODBUS, RS485, Remote Panel, Bacnet			

PowerPro EF300R Series

10kVA – 100kVA

Technical Specification



MODEL	EF310R (U)	EF315R (U)	EF320R (U)	EF330R (U)	EF340R (U)	EF360R (U)	EF380R (U)	EF3100R (U)
Power Rating kVA / kW	10 / 9	15 / 13.5	20 / 18	30 / 27	40 / 36	60 / 54	80 / 72	100 / 90
INPUT								
Nominal Voltage	380 / 400 / 415 Vac (3Ph + N + PE)							
Voltage Range	±20 - 40% @ 70% load%							
Frequency	50 Hz / 60 Hz, ±5%							
Power Factor	0.99 @ full load (Unity Power Factor - optional)							
Harmonic Distortion*	<3% @ 100%							
OUTPUT								
Nominal Voltage	380 / 400 / 415 Vac (3Ph + N + PE)							
AC Voltage Regulation	±1%							
Frequency Range	50 Hz or 60 Hz, ±2%							
Power Factor	0.9 (Unity Power Factor optional)							
Crest Factor	3:1							
Harmonic Distortion (Linear Load)	<3% @ 100% load							
Transfer Time	Zero							
Waveform	Sinewave							
EFFICIENCY								
On-Line Mode	Up to 93%							
ECO Mode	Up to 98%							
BATTERY								
Battery Type	VRLA Sealed Lead Acid Maintenance Free Batteries, Nickel Cadmium Batteries							
Battery Numbers	60 (+/-30) battery blocks (internal battery options available)						external	
GENERAL								
Operating Temperature	0 - 40°C							
Operating Humidity	90% (non-condensed)							
Acoustic Noise	<57 dB @ 1 metre				<62 dB @ 1 metre			<65 dB @ 1 metre
Protection Degree	IP20 (other on request)							
Management Software	Included							
Dimensions (mm) WxDxH	400 x 815 x 1040				515 x 855 x 1440			
Net Weight (kg)	93	97	100	173	197	209	220	
Comms. Adaptors Optional	SNMP, MODBUS, RS485, Remote Panel, Bacnet							

*Depending on power and input/output conditions



PowerPro EF300XU Series

Technical Specification

MODEL	EF3100XU	EF3120XU	EF3160XU	EF3200XU	EF3250XU	EF3300XU**	EF3400XU**
Power Rating kVA / kW	100 / 100	120 / 120	160 / 160	200 / 200	250 / 225	300 / 300	400 / 400
INPUT							
Nominal Voltage	380 / 400 / Vac 3P + N + G						
Voltage Range	±20% at 100% load / 40% at 70% load						
Frequency	50 Hz / 60 Hz, ±10%						
Power Factor	≥ 0.99						
Harmonic Distortion*	<3% @ 100%						
OUTPUT							
Nominal Voltage	380 / 400 Vac 3F + N						
AC Voltage Regulation	±1%						
Frequency Range	50 Hz / 60 Hz						
Power Factor	Unity				0.9	Unity	
Crest Factor	3:1						
Harmonic Distortion (Linear Load)	<2% @ 100%						
Transfer Time	Zero						
Waveform	Sinewave						
EFFICIENCY							
On-Line Mode	Up to 95.5%		Up to 96%				
ECO Mode	Up to 98%						
BATTERY							
Battery Type	VRLA Sealed Lead Acid Maintenance Free Batteries, Nickel Cadmium Batteries, Gel Batteries						
Battery Numbers	60 (+/-30) battery blocks external						
GENERAL							
Operating Temperature	0 - 40°C						
Operating Humidity	90% (non-condensed)						
Acoustic Noise	<62 dBA		<65 dBA			<67 dBA	
Protection Degree	IP20 (other on request)						
Management Software	Included						
Dimensions (mm) WxDxH	1440 x 475 x 890					1900 x 1250 x 775	
Net Weight (kg)	210	220	262	270	295	655	
Comms. Adaptors	SNMP, MODBUS, RS485, Remote Panel, Bacnet						

*Depending on power and input/output conditions

**Launching in 2022

PowerPro EF300R Series

Technical Specification



MODEL	EF3300R	EF3400R	EF3500R
Power Rating kVA / kW	300 / 270	400 / 360	500 / 450
INPUT			
Nominal Voltage	380/400 VAC 3P + N + G		
Voltage Range	±20%		
Frequency	50 Hz / 60 Hz ±10%		
Power Factor	≤0.99 @ full load		
Harmonic Distortion*	≤3%		
OUTPUT			
Nominal Voltage	380/400 VAC 3F + N		
AC Voltage Regulation	±1%		
Frequency Range	50 Hz / 60 Hz		
Power Factor	0.9		
Crest Factor	3:1		
Harmonic Distortion (Linear Load)	≤2% @ 100% load		
Transfer Time	Zero		
Waveform	Sinewave		
EFFICIENCY			
On-Line Mode	Up to 95%		
ECO Mode	Up to 98%		
BATTERY			
Battery Type	VRLA Sealed Lead Acid Maintenance Free Batteries, Nickel Cadmium Batteries, Gel Batteries		
Battery Numbers	60 (+/-30) blocks		
GENERAL			
Operating Temperature	0 - 40°C		
Operating Humidity	95% (non-condensed)		
Acoustic Noise	<68 dBA		
Protection Degree	IP20 (other on request)		
Management Software	Included		
Dimensions (mm) WxDxH	775 x 1250 x 1900		
Net Weight (kg)	635	680	890
Comms. Adaptors	SNMP, MODBUS, RS485, Remote Panel, Bacnet		

*Depending on power and input/output conditions



PowerPro EF300TR Series

10kVA – 500kVA

Technical Specification

MODEL	EF310TR	EF320TR	EF330TR	EF340TR	EF360TR	EF380TR	EF3100TR	EF3120TR	EF3160TR	EF3200TR	EF3250TR	EF3300TR	EF3400TR	EF3500TR
Power Rating kVA	10/9	20/18	30/27	40/36	60/54	80/72	100/90	120/108	160/144	200/180	250/225	300/270	400/360	500/400
INPUT														
Nominal Voltage	380 / 400 / 415 Vac (3Ph + N + PE)													
Voltage Range	±2%													
Frequency	50 Hz / 60 Hz ±5%													
Power Factor	0.99 @ full load													
Harmonic Distortion*	≤5% @ 100%													
OUTPUT														
Nominal Voltage	380 / 400 / 415 Vac (3Ph + N + PE)													
AC Voltage Regulation	±2%													
Frequency Range	50 Hz / 60 Hz ±5%													
Power Factor	0.9 @ full load													0.8
Crest Factor	≤3% @ 100%													
Harmonic Distortion (Linear Load)	380 / 400 / 415 Vac (3Ph + N + PE)													
Transfer Time	±2%													
Waveform	Sinewave													
EFFICIENCY														
On-Line Mode	Up to 93.5%													
ECO Mode	Up to 98%													
BATTERY														
Battery Type	VRLA Sealed Lead Acid Maintenance Free Batteries, Nickel Cadmium Batteries, Gel Batteries													
Battery Numbers	56 (+/- 28) blocks external													
GENERAL														
Operating Temperature	0 - 40°C													
Operating Humidity	90% (non-condensed)													
Acoustic Noise	≤57 dB @ 1 metre								≤68 dB @ 1 metre					
Protection Degree	IP20 (other on request)													
Management Software	Included													
Dimensions (mm) WxDxH	400 x 815 x 1040			515 x 855 x 1440			880 x 775 x 1900				1250 x 1055 x 1900	1245 x 775 x 1900		1250 x 840 x 2040 (*transformer cabinet)
Net Weight (kg)	187	244	270	393	457	536	539	595	647	910.5	1150	1283	1497	2800
Comms. Adaptors	SNMP, MODBUS, RS485, Remote Panel, Bacnet													

*Depending on power and input/output conditions

PowerPro EF LIFT Series

UPS SELECTION

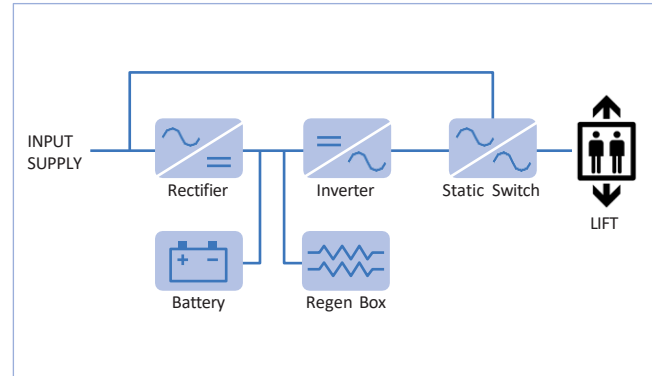
With lift systems for evacuation needing to meet BS 9999 Annex G, the selection of a fully working secondary power source is essential. UPS Systems are a cost effective choice as a secondary source for lifts, providing easy installation and integration. However Lift systems producing regenerative power during their standard operation will cause internal damage to standard UPS. The PowerPro EF LIFT has been purposely designed for this, providing a solution to Lifts producing a regenerative feedback.



REGENERATIVE LOAD OPERATION

The EF LIFT UPS incorporates an intelligent braking system, using IGBT controllers to electronically absorb any regenerative back feed energy from the lift. Regenerative load causes reverse current to flow to the output of the UPS system. This reverse energy causes the internal DC bus within the UPS to rise above safe levels of the UPS design and can cause damage to the DC Capacitors, Rectifier and Inverter.

The PowerPro EF Lift system has a separate IGBT Controlled Regeneration Box that connects directly to the UPS DC Bus. The DC bus voltage of the UPS typically floats at $\pm 405\text{Vdc}$ and can boost up to 435Vdc . The Regen Box monitoring system continuously analyses the internal rise of the DC bus voltage. When the voltage increases over 435Vdc fast switching IGBTs connect DC resistors and dissipate the energy into heat, protecting the UPS components and Inverter operation. When the DC bus voltage decreases back down to an acceptable level, the Regen Box self deactivates.



REGENERATIVE LOAD BOX SPECIFICATIONS

MODEL	RG4.5	RG9	RG12	RG18	RG24	RG30	RG36	RG48	RG60	RG75
Regenerative Load Max Feedback (kW)	4.5	9	12	18	24	30	36	48	60	75
UPS Compatibility (Minimum) kVA	15	30	40	60	80	100	120	160	200	250
Switching Type	IGBT									
Cooling	Forced Fan Bottom to Top									
Colour	Galvanised Metal									
Dimensions (mm) WxDxH	320 x 660 x 800					TBC				