



*Working in Power*

# TORNADO

online UPS

10-20 kVA three-phase/single-phase  
10-80kVA three-phase/three-phase

- LOCAL AREA NETWORKS (LAN)
- SERVERS
- DATA CENTERS
- INTERNET CENTERS (ISP/ASP/POP)
- INDUSTRIAL PLCS
- EMERGENCY DEVICES (LIGHTS/ALARM)
- ELECTRO-MEDICAL DEVICES
- TELECOMMUNICATIONS DEVICES
- INDUSTRIAL APPLICATIONS

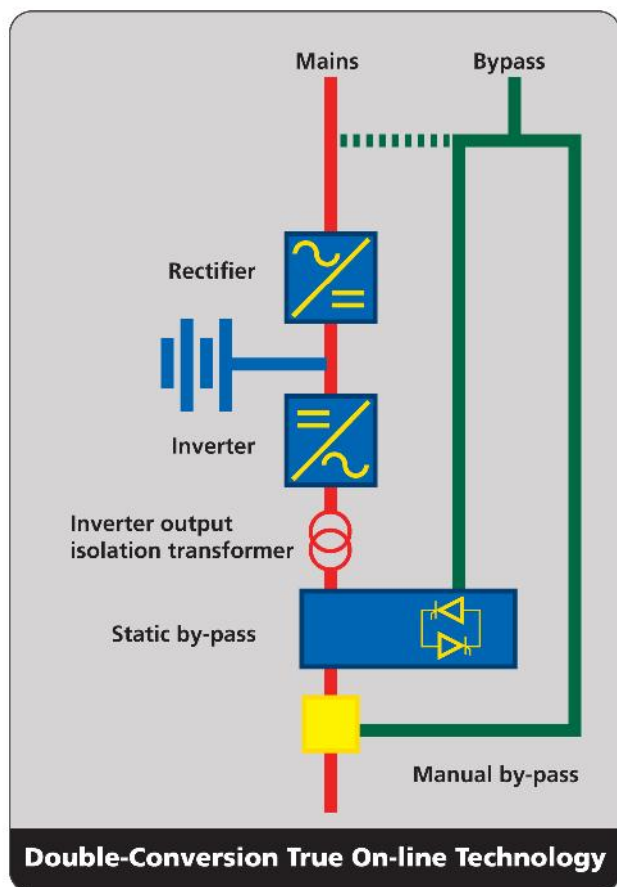
# TORNADO on-line UPS

The **TORNADO** series includes the 10-15-20kVA three/single-phase, 10-15-20-30-40 -60-80kVA three- phase models and uses double conversion on-line technology (VFI) with an in-built isolation transformer on the inverter output. The load is powered continuously by the inverter with a filtered, stabilised and regulated sinewave supply. The input and output EMI filters considerably increase the immunity of the load to mains disturbances and surges.

**TORNADO** provides maximum protection for vital 'mission- critical' networks, security applications (electromedical) and industrial applications thanks to its outstanding mechanical and electrical design.

**TORNADO** is supplied with UPS Network Monitoring<sup>3</sup> software as standard and can be remotely monitored using the Teleguard system from anywhere in the world.

Additional battery extension packs allow the standard battery runtime to be extended up to several hours.



**TORNADO** UPS is equipped with BATTERY PROTECTION. There are several features that help to prolong battery life span and performance, such as:

- cycling charging
- two voltage level charging
- temperature compensation charging
- protection against deep discharge
- battery self test
- compatibility with open vented acid battery

**Maximum protection for  
vital 'mission-critical'  
networks, security and  
industrial applications**





### Simplified Maintenance

Access for maintenance is entirely from the front of the UPS. With the door opened and the protective panel removed, the power components mounted on the sliding tray can be pulled out to provide easy access to all the electrical and electronic components for maintenance and repair work. This particular feature means that the MTTR (Mean Time To Repair) is typically less than 30 minutes.

A large amount of maintenance information is available from the front large LCD mimic panel. In addition system operating parameters are software configurable via a local PC to allow new functions to be added or adjustments made to operating specifications.

## Display Control Panel



### Main Features

- Large LCD screen with graphic display and improved high output power factor at 0.9
- Can configure as Frequency Converter 50Hz to 60Hz or vice versa
- Reliable, filtered, stabilised and regulated sinewave output (double conversion on-line technology VFI according to EN50091-3 specifications) with filters for atmospheric disturbance suppression
- High reliability: IGBT technology, full microprocessor control with no-break static and manual bypasses, extremely high short-circuit current to ensure compatibility with the most difficult transformer applications (lighting, drives and industrial processes) and an isolation transformer on the inverter output
- Maximum reliability and power availability - connect up to 8 units in parallel or N+1 redundancy, even of different power ratings (optional)
- Low input total harmonic distortion (<5%) (optional)
- High level diagnostics: event log with 128 messages, states, measurements and alarms - available from the built-in LCD in several languages
- Low loss high efficiency up to 98% in ECO-Mode for all Supreme models
- Simple to install:
  - Capability to install the UPS into any distribution system (neutral not required on rectifier input)
  - Capability to separate the rectifier/bypass power networks and of powering these from two separate sources, without galvanic isolation (necessary on those UPS without an output transformer)
- Capability of regulating the output voltage (to offset voltage drops down long cable runs)
- Built-in automatic and manual battery test feature, battery deep discharge protection and temperature compensating charger
- BACK FEED protection: to avoid energy feeding back into the mains supply should a fault occur.

# TORNADO

Technical Specification							
Three Phase Model	10 (3/3)	15 (3/3)	20 (3/3)	30 (3/3)	40 (3/3)	60 (3/3)	80 (3/3)
INPUT							
Rated power (kVA)	10	15	20	30	40	60	80
Rated voltage (V)	400 Vac three-phase						
Voltage range	+20%, -25%						
Rated frequency	50/60 Auto sensing						
Frequency range	45Hz to 65Hz						
Power factor	>0.9						
BY PASS							
Rated voltage (V)	400 Vac three-phase (380V, 415V selectable)						
Permitted voltage range	±15% (selectable from ±10% to ± 25% from front panel)						
Rated frequency	50/60 Auto sensing						
Permitted frequency range	± 2% (selectable from ±1% to ±6% from front panel)						
Standard features	Backfeed protection; separate bypass line						
BATTERIES							
Type	Maintenance-free sealed lead-acid						
Maximum recharge current (A)	0.2xC10						
RECTIFIER OUTPUT							
Maintenance voltage	Variable acc. to temperature (-0.5 Vx°C)						
Ripple	<1%						
INVERTER OUTPUT							
Rated power (kVA)	10	15	20	30	40	60	80
Rate (kW)	9	13.5	18	27	36	54	72
Number of phases	3 phase + N						
Rated voltage (V)	380/400/415 selectable						
Regulation of output voltage	360V to 420V 3 phase						
Crest factor (Ipeak/Irms)	3: 1						
Waveform	Sinewave						
Static stability	± 1%						
Dynamic stability & recovery	±5% in 20ms according to EN 62040 - 3 Class 1						
Frequency	50Hz to 60Hz selectable						
Overload	110% for 60 mins; 125% for 10 mins; 150% for 60 secs						
Frequency stability	±0.05% with mains supply failure						
ENVIRONMENTAL							
Remote signalling	Volt free contacts; UPS SNMP Network Management; ModBus/J-Bus Converter; Profibus Converter						
Remote controls	EPO and bypass						
Operating temperature	0°C - 40°C						
Relative humidity	< 95% (non condensing)						
Colour	Light Grey RAL 7035						
Noise@1m, 0 to full load (dBA)	60				62		
Protection rating	IP20						
Efficiency	Up to 98% in stand-by mode						
Weight (kg)	210	220	230	282	330	450	555
Dimensions (mm) (LxDxH), 6 pulse	555x740x1400					800x740x1400	
Back-up (min) Internal	from 0 to 30	from 0 to 15	from 0 to 10	0	0	0	0



# TORNADO

Technical Specification			
Three/Single Phase Model	10 (3/1)	15 (3/1)	20 (3/1)
INPUT			
Rated power (kVA)	10	15	20
Rated voltage (V)	400 Vac three-phase (380V to 415V configurable)		
Voltage range	+20%, -25%		
Frequency range	45Hz to 65Hz		
Power factor	≥0.9		
BY PASS			
Rated Current (A)	43	65	87
Rated voltage (V)	230 Vac single-phase (220V or 240V configurable)		
Permitted voltage range	±15% (selectable from ±10% to ± 25% from front panel)		
Rated frequency	50/60 Auto sensing		
Permitted frequency range	± 2% (selectable from ±1% to ±6% from front panel)		
Standard features	Backfeed protection; separate bypass line		
BATTERIES			
Type	Maintenance-free sealed lead-acid		
Maximum recharge current (A)	0.2xC10		
RECTIFIER OUTPUT			
Maintenance voltage	Variable acc. to temperature (-0.5 Vx°C)		
Ripple	<1%		
INVERTER OUTPUT			
Rated power (kVA)	10	15	20
Rate (kW)	9	13.5	18
Number of phases	Single-phase		
Rated voltage (V)	220/230/240		
Regulation of output voltage	210V to 242V phase/neutral (from control panel) ±15%		
Crest factor (Ipeak/Irms)	3: 1		
Waveform	Sinewave		
Static stability	± 1%		
Dynamic stability & recovery	±5% in 20ms according to EN 62040 - 3 Class 1		
Frequency	Same as the input (autorange)		
Overload	110% for 60 mins; 125% for 10 mins; 150% for 60 secs		
Frequency stability	±0.05% with mains supply failure		
ENVIRONMENTAL			
Remote signalling	Volt free contacts; UPS SNMP Network Management; ModBus/J-Bus Converter; Profibus Converter		
Remote controls	EPO and bypass		
Operating temperature	0°C - 40°C		
Relative humidity	< 95% (non condensing)		
Colour	Light Grey RAL 7035		
Noise@1m, 0 to full load (dBA)	60		62
Protection rating	IP20		
Efficiency	Up to 98% in stand-by mode		
Weight (kg)	200	220	230
Dimensions (mm) (LxDxH), 6 pulse	555x740x1400		
Back-up (min) Internal	from 0 to 30	from 0 to 15	from 0 to 10

## TECHNICAL ASSISTANCE SERVICES

**UPService**, our technical assistance facility uses highly trained engineers to provide a reliable and competent technical support and after-sales service.

### UPService can provide customers with:

- A dedicated **CALL CENTRE** for connection to the UPService organisation. UPService personnel are always available and ready to provide advice and assistance regarding UPS installation, maintenance, fault finding and repair.

- **FAST & READY**

A fast repair on site is guaranteed through the use of state-of-the-art UPS technology and the professionalism of the UPService personnel and Authorised Assistance Centres.

UPService guarantees that failed parts are replaced with original ones, tested and updated in order to maintain the safety, reliability and operating characteristics of the UPS.

- **COMMISSIONING AND START-UP**

UPService can provide assistance during commissioning and startup of the UPS equipment on-site with additional training during handover to site personnel.

UPService engineers can also verify site suitability, analyse and advise on potential problems, and disconnect and relocate equipment. UPService recommend that all hardwired installations are commissioned by UPService engineers.

- **MAINTENANCE CONTRACTS** can be provided by UPService to minimise response times and repair costs. Contracts range from periodic inspections to comprehensive cover including labour and materials.

- The **TELEGUARD** software package provides remote 24 x 7 UPS supervision. TeleGuard can interrogate G-TEC UPS connected to a local telephone line to check on their operating logs and system status.

Should the UPS report an alarm condition, the UPService Call Centre is immediately notified and a dedicated customer response activated. Routine site reports can be sent automatically to customer personnel.

- UPService organises regular **TECHNICAL TRAINING COURSES** for UPS operators and installers.

## Communication and Power Management Solutions

### ADVANCED COMMUNICATION

- Compatible with **TELEGUARD** for remote maintenance
- Advanced, multi-platform communication, for all operating systems and network environments:

**PowerShield<sup>3</sup>** supervision and shut-down software included, with SNMP agent, for Windows NT 4.0, XP, Vista, Mac OS 10.x, Linux, Novell operating systems. The FC is equipped with a cable for direct connection to the PC (Plug and Play)

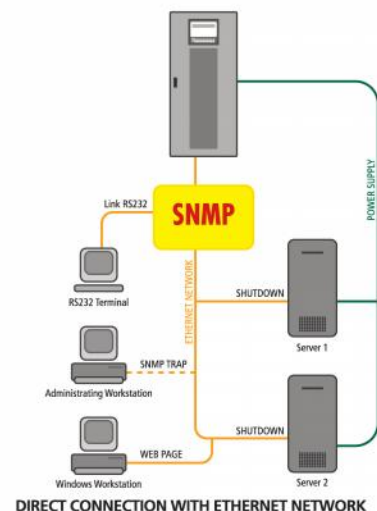
- \*Can also provide shut-down software for:  
IBM AIX; Free BSD; BSDI UNIX; BSD/OS; SCO Unixware;  
SCO Openserver; Sun Solaris; Compaq True64; HP UNIX;  
HP OpenVMS; HP Openview; SGI Irix MIPS; NCR UNIX
- Double RS232 serial port
- Network adapter slot for SNMP agent
- EPO (Emergency Power Off) shut down input contact
- Remote control panel (optional)



**DETAILED UPS PARAMETER DISPLAY**  
**Powershield<sup>3</sup>** provides all the information required for first level diagnostics.

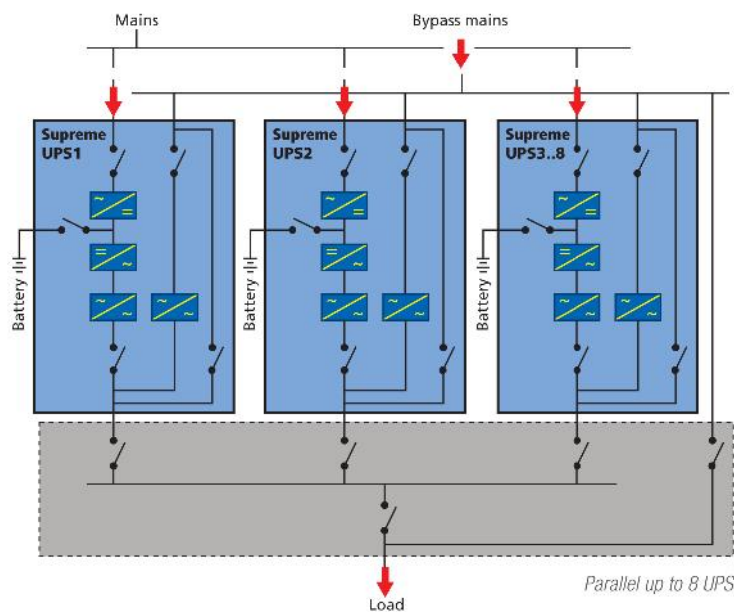


**BLOCK AND FUNCTIONAL DIAGRAMS**  
**Powershield<sup>3</sup>** also displays the UPS in block format providing the user with information regarding the operating status.

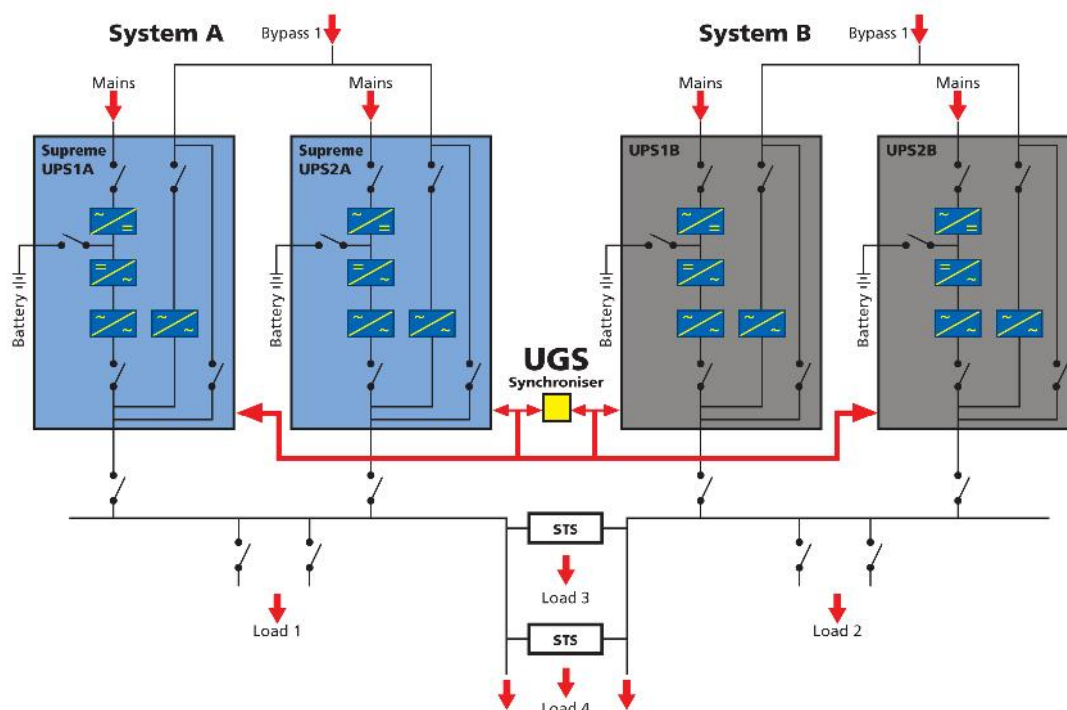




# Flexible Configuration



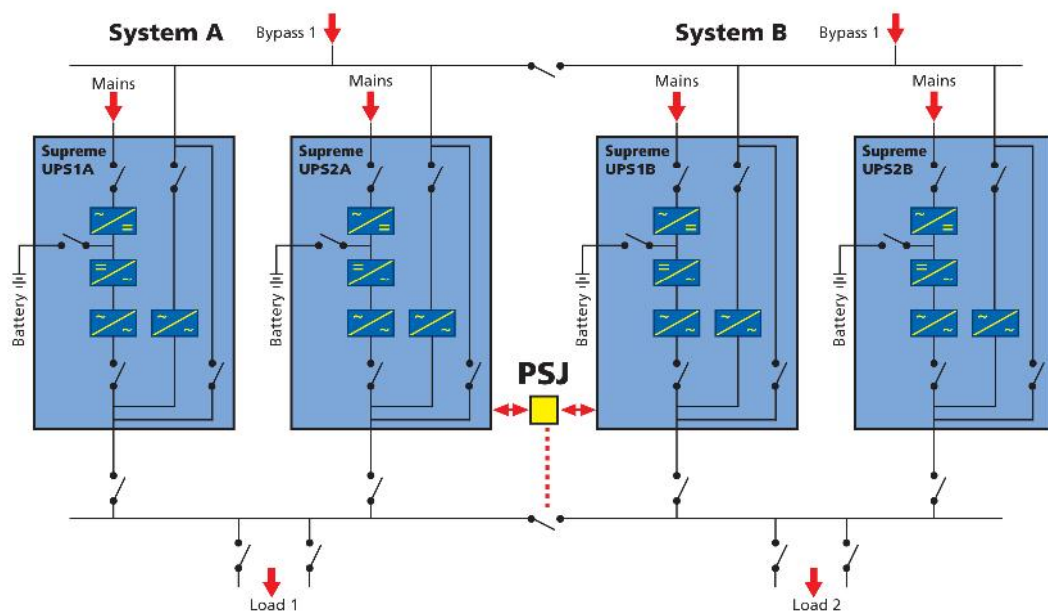
**UPS  
Redundancy:  
Parallel**



**Distribution  
Redundancy: UGS**

UPS Group Synchroniser (UGS) ensures 2 or more UPS parallel groups remain synchronised even during a mains supply failure.

The UGS also enables Supreme to be synchronised with an independent power source and even with different rating.



**Distribution  
Redundancy: PSJ**

The Parallel Systems Joiner (PSJ) enables the connection of two UPS groups operating in parallel configuration through a power coupling switch.