

# UNIBLOCK UBR Hybrid Rotary UPS



from 150kVA-40MVA

**Nothing protects quite like Piller**

[www.piller.com](http://www.piller.com)

## Piller UPS

### About Piller

Since its formation by Anton Piller in 1909, the company Piller has been synonymous with electrical machines of the highest quality and reliability. Today, Piller, from its headquarters in Germany and via its regional offices, representatives and distributors world-wide, continues that tradition into the 21st century.

Piller produces high performance power protection systems and converters. Combined with the highest levels of client support and engineering excellence available anywhere, Piller is internationally recognised as the most respected name in its field.

Piller is a wholly owned subsidiary of the multi-disciplined global UK engineering group, Langley Holdings plc. ([www.langleyholdings.com](http://www.langleyholdings.com))



### The Problem

The internet and telecommunication revolution has transformed the way we do business, process data and communicate across the globe. As we become increasingly dependent upon information technology, minimising system failures is absolutely critical.

Nearly every day a mains failure occurs lasting longer than 10 milliseconds which seriously endangers the operation of computer centres and industrial processes. Of all the malfunctions in such operations one of the major causes is an interrupted or poor quality power supply.

Informed business leaders understand the need to minimise risk to their IT and industrial power systems and place power supply protection at the centre of their risk management strategy.

"Due to the increasing performance, processing speed and integration level of electronics, the requirements placed on the quality of power supplied to IT systems are so high that the necessary energy cannot usually be drawn directly from the public supply network" (VDEW: German Association of Electricity Supply Services).

Many businesses are unaware of the very real threat posed to them by the numerous and unexpected mains electrical supply disturbances and the resultant risk of data or production loss. Re-assembly of lost data or the re-starting of a production process can be extremely time-consuming at best and at worst impossible. For example, an analysis made in the USA forecasts the financial survival periods of major business sectors like Banking and Insurance companies to be between 2 - 5 days after the failure of their IT systems.

*Mains electrical supply disturbances are a major threat to business and the resulting loss of income or data is often disastrous.*

**PROTECTING:**  
**Information Systems**  
**Broadcasting & Telecommunications**  
**Industrial Processes**  
**Medical & Scientific**

## Maximum power supply when compromise is not an option

### The Solution

A Piller Uninterruptible Power System (UPS) provides the essential cover, and peace of mind, that ensures mains disturbances don't have a major impact on your business. Piller is a leading manufacturer of large scale UPS and many thousands of Piller UPS are currently installed globally, providing major industries with the power protection they need.

The IT load is changing rapidly and today's UPS technology must have the capability to meet the needs of tomorrow. For example, in just a few years the design of UPS power requirements for data centres has grown to such an extent that there are serious implications for other UPS designs in use, but these additional demands are easily met by the unique Piller rotary technology!

The Uptime Institute sets out the requirements for the design of data centres to various standards. As you move up these standards fewer and fewer solutions are capable of supporting these levels. At the highest standard required by data centres, entire redundant UPS systems must support a single load and this creates new technical challenges not readily met by mass produced UPS solutions.

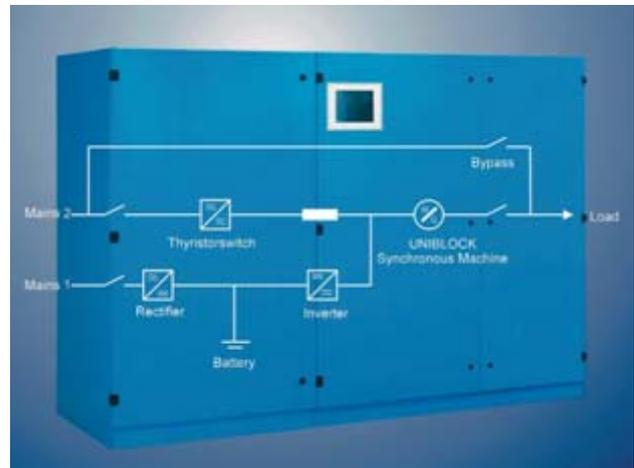
Governed by various levels of infrastructure that must surround computing technology the Uptime Institute states that there is a requirement for the best data centres to be protected at the industry standard tier level 4.

A Piller UNIBLOCK UBR has the versatility and capability to meet these demands through characteristics such as:-

- Full galvanic isolation for independently earthed systems
- Internal redundancy for optimum reliability
- Unique dual diversified input capability
- Voltage and frequency control for synchronised systems
- Adaptability for changes in load demands such as leading power factor
- Short circuit capability

Piller has many years experience operating internationally in providing high-performance power systems, and Piller UNIBLOCK UBR technology is based on this know-how. Our unique concept is the combination of high performance motor generator construction with straightforward power electronics, controlled and managed by the latest processor technology.

This topological approach to UPS design has been repeatedly proven to be the best choice when compromise is not an option.



*'Informed business leaders place power supply protection at the centre of their risk management strategy'*

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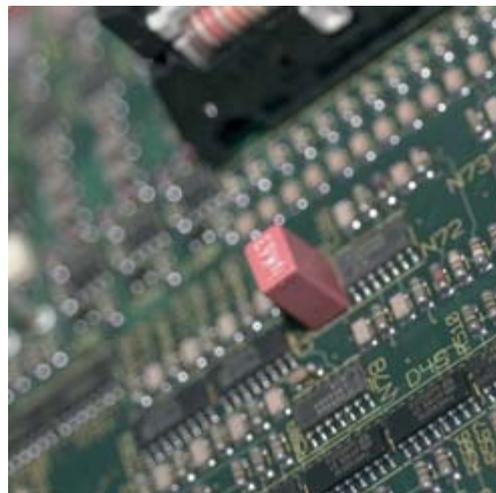
## Innovation for your benefit

The Piller UNIBLOCK machine combines a motor and a generator in one, three-phase synchronous unit. During construction, the windings of both components are incorporated in a shared stator and are excited by a common rotor. The energy transfer from the motor to the generator takes place via direct magnetic coupling without loss and without electro-mechanical conversion, thus providing electrical (galvanic) isolation between the mains supply and the load.

The advantages of this form of construction, which has a high load-carrying capacity are:- it is robust, highly efficient, can be loaded continuously and overloaded simultaneously, which is not possible with power electronics alone as found in a static UPS.

The UNIBLOCK machine prevents load disturbances reaching the mains. It has a damper cage which absorbs current harmonics, irrespective of load current and load power factor. Unbalanced loads are also equalised.

By combining the UNIBLOCK machine with the topology of the UBR configuration, a truly unique concept has been achieved: a natural sine wave whilst utilising the flexibility of power electronics but still maintaining an extremely high degree of reliability.





## UNIBLOCK UBR a truly unique concept

### Why the Piller UNIBLOCK UBR system is superior to other UPS systems

Feature	Benefit
<b>Very high reliability.</b>	Higher availability and reduced risk to your critical loads.
<b>High inherent fault clearing capacity.</b>	Rapid disconnection of faulty loads is possible even in battery operation. No by-pass supply needs to be present, which is necessary for static systems, which reduces the risk of outages to your critical load.
<b>Higher efficiency.</b>	Reduces operating costs and minimises the total cost of ownership of your UPS system.
<b>No power capacitors or electric fans.</b>	Reducing your maintenance costs and more importantly removing the risk of unplanned failure of these components.
<b>Full galvanic isolation.</b>	Independent earthing systems are easily implemented avoiding circulating currents and erratic discrimination without the need for additional isolation transformers – this reduces your system complexity, improves efficiency, and gives you cost and space savings.
<b>Near unity input power factor.</b>	Power factor protection is not required saving you capital and maintenance costs.
<b>No crest factor limit.</b>	Capable of delivering high peak currents for harmonic loads.
<b>Water-cooled option.</b>	Direct coupled cooling eliminates your need for air-conditioning, saving you space, cost, and removes the need for additional maintenance overheads.
<b>Full voltage and frequency control.</b>	UBR is the only UPS to offer rotary characteristics combined with double conversion allowing you to synchronise for your Tier 3 and Tier 4 requirements.
<b>Redundant power conditioning paths.</b>	The UPS can be fed from different sources via separate power conditioning paths which can dramatically increase your scheme reliability.
<b>Natural sine wave generation.</b>	The UPS output is a pure, natural sine wave that gives you a future-proofed UPS for your ever changing IT loads
<b>A damper cage for filtering harmonics.</b>	No additional harmonic filtering required; improves efficiency, saves you space and cost.
<b>Capable of active change in redundancy status.</b>	Optimising your UPS system based on the actual loads, giving higher levels of efficiency and reducing risk to your load.
<b>Extremely low AC battery ripple.</b>	Lower AC ripple (compared with static) extends the service life of your battery.
<b>Low internal sub-transient reactance.</b>	Clean voltage sine wave reducing voltage distortion for high harmonic loads, reduces your need for harmonic filters saving you money.

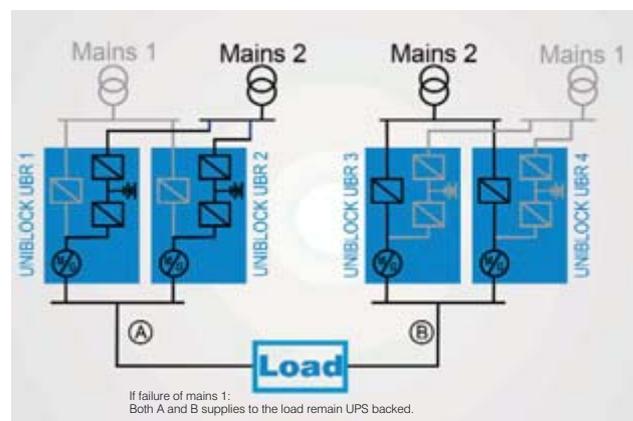
## Your requirements determine the solution

### Fault Clearing Capability

The UNIBLOCK by virtue of its low output impedance inherently delivers fault current of 14 times the nominal full load. Offering fault current delivery similar to the systems utility transformer, security is provided even when utility power is not available to the site. This guarantees disconnection of a downstream fault within 10 milliseconds, without going to an unprotected bypass source, if available, as required by other UPS systems! With UNIBLOCK during fault clearing, full UPS function – including battery operation – is maintained and remaining loads are unaffected. The UNIBLOCK UBR assures that a localised fault won't take out the entire data centre.

This inherent ability to clear faults is a critical attribute in N+N system architecture where the load needs to be supplied by synchronous supplies from the independent UPS systems. Both independent UPS systems can be synchronised to each other and maintain full short circuit clearing ability under all

### UNIBLOCK UBR with dual input



operating modes. Other UPS systems are unable to provide a total fault clearing capability in order to remain synchronised.

**The unique configuration flexibility of the UNIBLOCK UBR means that a number of distinct system advantages can be utilised to facilitate the need to be concurrently maintainable and truly redundant. These advantages are not all available on other technologies:**

	UNIBLOCK UBR	Example Diesel UPS	Example Static UPS
Number of full load power paths (including bypass) <sup>1</sup>	4	3	3
Number of conditioning power paths <sup>1</sup>	3	2	2
External system to system synchronisation <sup>2</sup>	✓	✓	✓
Short circuit fault discrimination without Utility	✓	✓	✗
Full UPS function without bypass	✓	✓	✗
External synchronisation capability with full UPS function <sup>2</sup>	✓	✗	✗
Isolated 4 pole N-E system capability (for S+S solutions) <sup>3</sup>	✓	✗	✗
Full galvanic isolation <sup>3</sup>	✓	✗	✗
Dual input capability for power conditioning paths <sup>4</sup>	✓	✗	✗

<sup>1</sup> The UNIBLOCK UBR is unique in providing power conditioning and isolation on three paths.

<sup>2</sup> Static and Diesel UPS lose some functionality.

<sup>3</sup> Without additional isolation transformers in Static and Diesel UPS, circulating currents can arise.

<sup>4</sup> Input distribution failure does not force the use of emergency back-up mode and provides concurrent maintenance upstream.



### UNIBLOCK UBR with built-in Water Cooling

Expensive air-conditioning or ventilation measures are unnecessary where chilled water is readily available.

The integrated cooling unit provides the UPS system with its own climate. The UPS can even be operated in small rooms, in aggressive environments or one containing dust or aerosols. Each water-cooled Piller UNIBLOCK UBR module is equipped with its own correctly rated cooler. This means that no air-conditioning unit is required.

#### Advantages:

- Higher efficiency of your system
- Insensitive to the amount of pollution in the surrounding air
- Lower investment costs
- Lower operating costs
- One supplier, one service partner
- Smaller space requirement
- Reduced noise pollution

### UNIBLOCK UBR in Containerised Units

As an alternative to the stationary version, the UNIBLOCK system is also available as a high-performance and economical container unit. All components necessary for operation are integrated into the container. The system is immediately ready for operation after it has been coupled to the AC supply system. This variant eliminates planning costs and the costs of integrating the system into the building structure.



*Cross section of water-cooled unit*

**A:** The enclosed air circuit is operated by an internal fan impeller incorporated in the rotor of the electrical machine.

**B:** The UNIBLOCK UBR with built in water cooling is connected to the chilled water circuit of the building.

*'UNIBLOCK UBR assures a localised fault won't take out the entire data centre'*

## UNIBLOCK UBR user-friendly touch control

### Operator Control

The state-of-the-art touch control panel is designed for optimum man/machine communication. The clear layout and intuitively accessible control panel has been made fully user-friendly. A built-in mimic display with clear symbols allows all operating states to be seen at a glance.

Detailed information on the condition of the individual modules is immediately available. Additionally, interactive communication with built-in safety routines prevents unintentional switching operations. The optional remote control version enables remote monitoring and management, for example at a central command centre, with simultaneous access to individual systems.

### Touch Panel Features

- High resolution colour display
- Visualisation system for rapid capture of parameters such as current, voltage, frequency and phase
- Multi-lingual menu for use in specific countries
- Menu-driven operator prompts for fast access
- Field-proven, in-depth information for precise system monitoring
- Diagnostic system with built-in event monitor, storing the last 1200 events
- Battery monitor for battery parameters such as current, voltage and temperature





The UNIBLOCK UBR module has a full range of connection and interface options to allow the UPS to be integrated within the BMS/EMS systems of the building to ensure compatibility and simplicity of installation.

### Remote Diagnostics Service

To offer you the highest level of service and support possible UNIBLOCK has the potential for two-way communication between the UPS module and our national service centres. Through this link, Piller can offer an enhanced support service to clients and provide both remote diagnostic and remote service support solutions through dedicated Remote Diagnostics Service (RDS).

### Remote Access

The system can be configured with two different levels of access; these levels are set-up as part of the commissioning process and are then password protected within the UPS system menu. With the different levels of access, there are different levels of control:

The first allows for the events and status to be 'read only'. This means that the engineer can only request information and view the event log. No changes can be made to the system.

A higher second level allows for the events and status to be read and then allows the engineer to remotely take full control of, and change the operational state of the UPS module.



*'state-of-the-art touch control panel is designed for optimum man/machine communication'*

**PILLER**

## Unrivalled after sales service

Competence and responsiveness are the watchwords of our business.

Piller believe that product and service belong together, and the Piller name is synonymous with excellent after sales service. The best technology is only as good in the long term as the service that underpins it.

For this purpose, a comprehensive network of qualified service staff is available – world-wide.

The premium quality and technical maturity of every Piller product already guarantees a high degree of functional security, and together with quality maintenance, this further reduces any risk of possible breakdown.

Piller offers a comprehensive package of services tailored to your requirements:

- **Technical consultation**
- **Operator training**
- **Functional testing**
- **Maintenance**
- **Fault analysis and troubleshooting**
- **Customer training**
- **Remote system diagnosis and support**





**Service Team Capability**

Piller's customer service engineering team is highly qualified and trained on all products and services. As a combined total, field service teams have centuries of experience working on three generations of UPS system. Piller operates a 'best of breed' philosophy in all working practices and is believed to be market leaders in first time resolution of site problems.

**Piller Emergency Call-Out Service**

Piller understand that malfunctions also occur outside working hours, which is when competent help is needed quickly. An emergency call out service ensures that a Piller Service specialist can be reached quickly. Service centres are strategically positioned in relation to Piller's installed base, for the best possible response time and familiarity with every installation.



*'on demand 24 hours a day, 365 days a year'*

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SYSTEM INTEGRATION



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HEADQUARTERS

**Piller Group GmbH**

Abgunst 24 |  
37520 Osterode |  
Germany

E [info@piller.com](mailto:info@piller.com)

**Piller Australia Pty. Ltd.**

2/3 Salisbury Road |  
Castle Hill | NSW 215-4 |  
Australia

T +61 2 9894 1888  
F +61 2 9894 2333  
E [australia@piller.com](mailto:australia@piller.com)

**Piller France SAS**

107-111 Av | Georges Clémenceau |  
B.P. 908 | F-92009 Nanterre Cedex |  
France

T +33 1 47 21 22 55  
F +33 1 47 24 05 15  
E [france@piller.com](mailto:france@piller.com)

**Piller Germany GmbH & Co. KG**

Abgunst 24 |  
37520 Osterode |  
Germany

T +49 5522 311 0  
F +49 5522 311 414  
E [germany@piller.com](mailto:germany@piller.com)

**Piller Italia S.r.l.**

Centro Direzionale Colleoni |  
Palazzo Pegaso 3 | Viale Colleoni 25 |  
20041 Agrate Brianza (MB) |  
Italy

T +39 039 689 2735  
F +39 039 689 9594  
E [italia@piller.com](mailto:italia@piller.com)

**Piller Iberica S.L.U**

Paseo de la Habana | 202 Bis B |  
E-28036 Madrid |  
Spain

T +34 91 345 86 58  
F +34 91 350 16 33  
E [spain@piller.com](mailto:spain@piller.com)

**Piller Power Singapore Pte. Ltd.**

25 International Business Park |  
#04-13/14 German Centre |  
Singapore 609916

T +65 6562 9100  
F +65 6562 9109  
E [asiapac@piller.com](mailto:asiapac@piller.com)

**Piller UK Limited**

Westgate | Phoenix Way |  
Cirencester |  
Gloucestershire | GL7 1RY |  
United Kingdom

T +44 1285 657 721  
F +44 1285 654 823  
E [uk@piller.com](mailto:uk@piller.com)

**Piller USA Inc.**

45 Turner Drive | Middletown |  
New York 10941-2047 |  
USA

T +1 800 597 6937  
F +1 845 692 0295  
E [usa@piller.com](mailto:usa@piller.com)

Representatives and Distributors in:

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Power Systems