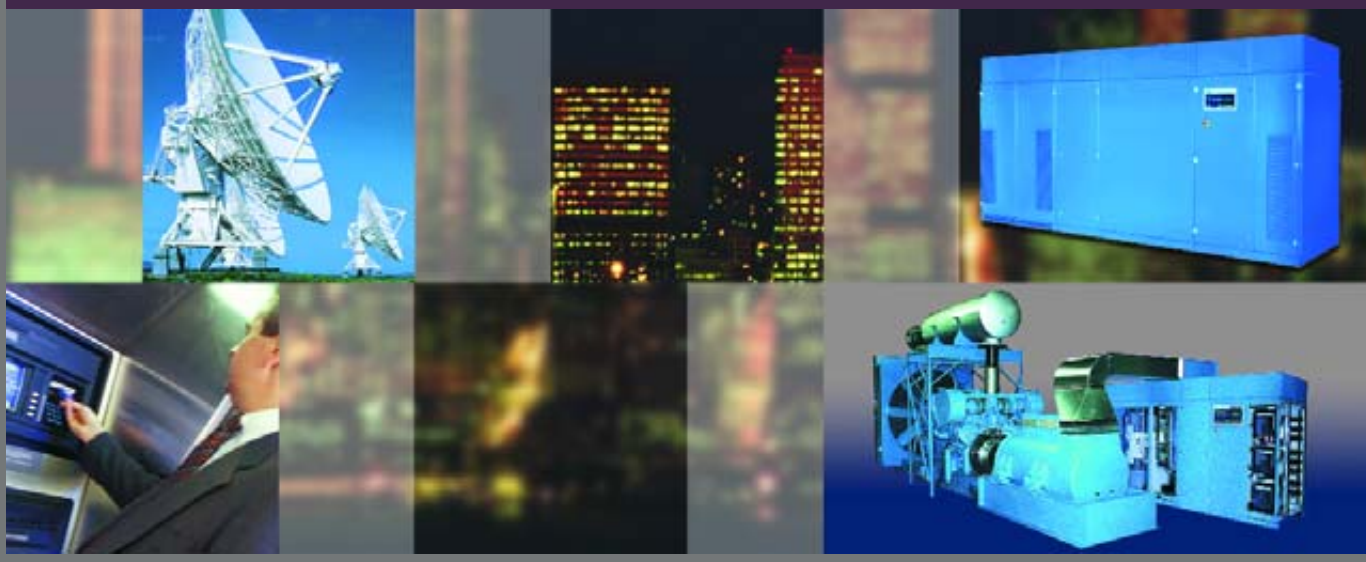
PILLER
Power Systems

TECHNIK

Dynamic UPS



UNIBLOCK

Nothing protects quite like Piller

www.piller.com

Safeguard your business from power outage…

'UNIBLOCK simply provides confidence in delivering business on schedule day after day, year after year'

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 Power Systems, from its headquarters in Germany and via its regional offices, representatives and distributors worldwide, continues that tradition into the 21st century.

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

Piller Power Systems is a wholly owned subsidiary of the multi-disciplined global UK engineering group, Langley Holdings plc.
(www.langleyholdings.com)

P R O T E C T I N G :

- Biotechnology Development
- Broadcast Centres
- Healthcare Facilities
- Industrial Processes
- Information Systems
- Pharmaceutical Production
- Telecommunications Networks

Today's "on demand" business requires the highest availability of quality power to serve all processes. The UNIBLOCK is a key contributor to providing seamless power to your business systems and processes, providing independence from utility power and disturbances on the supply network. UNIBLOCK simply provides confidence in delivering business on schedule day after day, year after year.

Every Piller rotary UPS at its heart has the UNIBLOCK rotary machine. A system with millions of hours of reliable field operation giving high efficiency and performance with minimum components. The UNIBLOCK is an integration of two fully rated synchronous machines on to a common frame and completely but simply embraces the natural principles of electrical power generation.

UNIBLOCK – continuous protection

'UNIBLOCK UPS assures that your business never has a costly power outage, not even for a single second'

Protecting your business

Delivering exceptional availability of quality output power

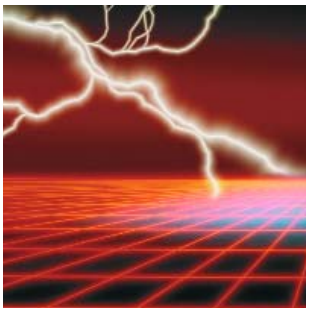
- **UPS Mean Time Between Failure upto 1,200,000 hours**
- **Redundant master/slave controllers**
- **Redundant on-board power supplies**
- **Leading and lagging output power factor without de-rating**
- **Natural sine-wave output**
- **Guaranteed cooling**
- **High load step ability**
- **High overload ability (on-line)**
- **Dual utility input (all R variants)**
- **Digital signal processing**
- **Exceptionally high power output availability**
- **100% unbalanced load**
- **Unlimited crest factor**
- **Inherent fault clearing ability without utility**
- **In built protection against utility short circuit faults**
- **Oversized neutral**

Ownership

Peace of mind, ease of operation and low cost of ownership

- **Quiet in operation**
- **Water cooling available (selected models)**
- **Paralleling and synchronisation ability**
- **A range of communication protocols and industry standard interfaces**
- **Remote monitoring**
- **Integration with building management system**
- **Intuitive menu driven operation**
- **Small footprint and no rear access required**
- **High efficiency**
- **Virtual unity input power factor**
- **Sinusoidal input current**
- **Low whole life cost**
- **Quick swap components**

High Performance



'UNIBLOCK is capable of handling these leading power factor environments without over-sizing as required by other UPS systems'

Leading power factor

Loads are becoming more common among today's power demands. The latest enterprise-class servers have internal power supplies, designed to meet new international standards, that cause overall power factor swings through unity to leading. The UNIBLOCK is proven capable of handling these leading power factor environments without over-sizing as required by other UPS systems. Because Piller's dynamic UPS systems utilize natural principles of power generation, the UNIBLOCK provides inherent assurance that ever-changing power requirements will be met today and tomorrow!

Flexible in application

UNIBLOCK's full range of performance characteristics can protect any combination of loads - whether linear or non-linear – without unwanted interaction between them. As the motor/generator set guarantees unrestricted energy flow under all load conditions, the UNIBLOCK operates perfectly for both IT and industrial applications. UNIBLOCK is ideal for IT loads, including leading power factor issues, as previously described.

For industrial loads, UNIBLOCK's robust design easily handles motor in-rush currents without oversizing as required by other units. Piller's dynamic UPS can handle all types of load, and can easily be upgraded to suit the application.

Superior load protection

Quality conditioned power

The UNIBLOCK provides protection against both utility and load disturbances. Its robust electro-mechanical design naturally absorbs and filters any disturbances, including input and output harmonics, while assuring a clean, regulated sine wave. True isolation is also assured by UNIBLOCK's unique bypass switching device, an electromechanical switch that is not susceptible to short circuits compared to other UPS systems.

The UNIBLOCK's power conditioning delivers premium performance, including:

- Low input distortion factor, not exceeding 3% in normal operation
- Low output voltage distortion from no load to full load
- Low output impedance
- Superior transient response
- High input power factor provides power factor correction by buffering poor power factor loads.
- MTBF Figure upto 1,200,000 hours.

'UNIBLOCK's robust electro-mechanical design naturally absorbs and filters any disturbances'

Inherent fault clearing ability

'UNIBLOCK assures that a localized fault won't take out the entire data centre'

Fault Clearing Capability

The UNIBLOCK by virtue of it's 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 10ms, without going to an unprotected bypass source, if available, as required by other UPS systems! With UNIBLOCK during the fault clearing condition, full UPS function – including battery operation – is maintained and remaining loads are unaffected. This is especially important in data centre applications during "limited area" events that can occur during the change out of IT equipment. The UNIBLOCK assures that a localized fault won't take out the entire data centre.

This inherent ability to clear faults is a critical attribute in N+N system architecture were the load needs to be supplied by synchronous supplies from the independent UPS systems. Both independent UPS systems can be synchronized to each other and maintain full short circuit clearing ability under all operating modes. Other UPS systems forgo total fault clearing capability to remain synchronized.

UNIBLOCK – User friendly

'A full history of system events can be called upon from the display, enabling the operator to view the system's operation 24/7'

Ease of Operation

For the user, the UNIBLOCK is friendly and gives continuous peace of mind. The touch operated, colour display panel is presented as a system mimic diagram, permitting intuitive operation. The display provides clear indication of system status at all times and continually monitors and records the systems operation. At any time a full history of system events can be called upon from the display, enabling the operator to view the system's operation 24/7.

Interface Systems

To communicate with the UNIBLOCK, several interface platforms are available, including:

- RS232, RS485 and digital current loop serial interfaces
- SNMP network integration
- OPC-Server independent connectivity
- MODBUS and PROFIBUS protocols
- Remote monitoring

Maintainability

UNIBLOCK is carefully engineered with maintenance in mind to minimize any down time. Piller equipment is quick to service, by design. UNIBLOCK's inner workings are precisely organized to be accessed easily from the front. Component locations are clearly documented and identified. Many parts, such as circuit boards and sensors, utilize instant plug and play connectors. Cable harnesses are smartly routed. Even bearings are designed to be efficiently serviced. UNIBLOCK maintains a record of events for speedy assessment of equipment performance.

Quick installation

‘ UNIBLOCK is delivered "parallel ready" and does not require specially configured integration circuitry like most other UPS systems’

Smooth Integration

The UNIBLOCK integrates capably into any new or existing power quality system. The UNIBLOCK is delivered "parallel ready" and does not require specially configured integration circuitry like most other UPS systems. UNIBLOCK offers flexibility to be connected in a variety of configurations to provide redundant protected power paths from multiple upstream sources. The appropriate system can be engineered by Piller's systems integration team, in-house engineers and project managers with decades of large-system expertise in electrical hardware, controls and software. In a collaborative process, we conduct a thorough assessment of the specific project objectives and we engineer a requirements-driven plan. Therefore, each power solution is developed with continuity and quality every time!

Energy storage systems

'Piller's Powerbridge eliminates the operational, maintenance and environmental issues that are generally associated with batteries'

Research shows that utility disturbances lasting more than 10ms occur almost daily. 97% of these power disturbances are less than 3 seconds in duration. Therefore, the need for capable short term power protection cannot be overstated. UNIBLOCK offers a choice of short term energy storage – either traditional batteries or POWERBRIDGE, Piller's very own advanced kinetic energy storage system.

Battery friendly

The UNIBLOCK is very battery friendly, maximising their service life and reducing costs. The batteries are not subject to constant harmful DC ripple currents from inverter operation and the UNIBLOCK's inherent kinetic energy enables micro-breaks to be bridged without cycling the DC support. The UNIBLOCK has advanced controls to manage and preserve batteries, including flexible pre-set recharging rates, automatic adjustment of battery cut-off voltage, temperature sensors to optimize charging voltage, and a battery monitor that displays time remaining, capacity remaining and current.

Battery free

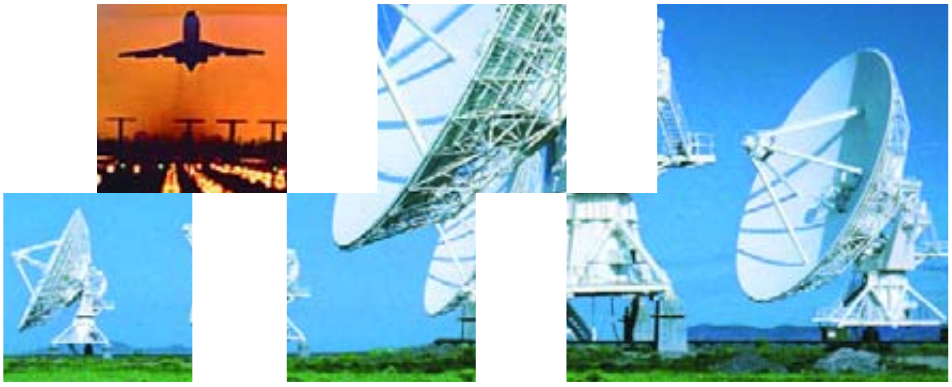
Piller offers a battery-free option. The unique Piller POWERBRIDGE uses kinetic energy to ride through short power outages or to span the transfer time to standby engine generators. The POWERBRIDGE eliminates the operational, maintenance and environmental issues that are generally associated with batteries.

The POWERBRIDGE's low speed rotating mass (flywheel) stores 16.5Mj of energy, which provides outage ride-through of 15 seconds to 2 minutes.

By design, the bearings, the system's primary "consumable" item, have a long life. Utilizing a magnetic support that "lifts" the flywheel and limits the weight on its mechanical bearing results in, stress-free operation and greater efficiency (99%)! Built in redundancy, ever so important to resilient UPS design, is also incorporated into POWERBRIDGE. Redundant mechanical bearings, designed for the life of the system are fitted as standard.

Long term diesel powered coverage

'During a complete power outage, UNIBLOCK's engine generators keeps power on for critical loads as long as required'



Engine Generator Integration

To protect against long-term outages, UNIBLOCK can be configured with a separate diesel generator system or supplied with an integrated diesel engine solution. With the choice of either battery or battery free short term energy storage customer specific ride through times can be built into the system design. Whichever storage system is selected you can be assured that frequent engine starting will be avoided, reducing component stress and pollution/noise nuisance.

Piller's integrated engine systems utilize a horizontal orientation where the UNIBLOCK is directly coupled to the engine through a clutch. This design eliminates the need for separate diesel generator controls, switchgear and associated controls producing a compact and fully compatible system. Unlike other diesel systems the short term energy storage system is located off the engine set. This apart from significantly reducing the length of the engine frame, also gives the ability to extract diesel power from the system in the event of the energy storage system being out of service. The energy storage system is also protected from the heat and vibration produced during engine operation.

Optimizes engine step loading capability

When a step load is placed on the UNIBLOCK system during diesel operation, the integrated POWERBRIDGE can deliver or absorb power in order that "in-specification" output frequency is maintained to the load. This alleviates the need to oversize the engine to handle step loading as the delay in engine response is bridged.

The integrated UNIBLOCK diesel system does not require engine oversizing, as is frequently required when separate UPS and diesel generator systems are used. The power from the engine is delivered directly to the UNIBLOCK through the clutch. There are no UPS input rectifiers and undetermined battery charging characteristics to consider when determining the engine horsepower.

UNIBLOCK as a generator

A winding, separate to that used in the UNIBLOCK Machine to power the UPS loads, can be utilized to support short break loads such as cooling plants and lighting. This feature, embracing the fundamentals of sound system design, produces immunity to faults and harmonics presenting themselves on either load bus during diesel operation.

Unrivalled after sales service

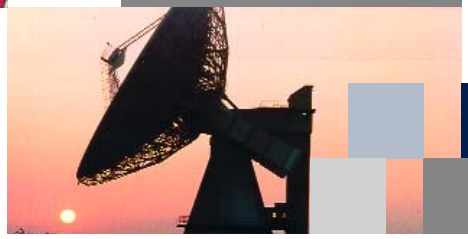
Across the globe the Piller network is committed to delivering world-class service resources and Piller clients can always be confident that a highly qualified team of service and support technicians are there to uphold the very best standards of customer care.

Services range from installation and commissioning to predictive analysis, emergency call-out, spare parts, planned maintenance and training. Sophisticated remote monitoring can track a system's operating status at any time, anywhere. With the Piller "Total Care" program, Piller simply takes care of everything.

- UPS maintenance
- Battery maintenance
- Technical support
- Operator training
- 24 hour call-out
- Temporary UPS systems
- Comprehensive spares
- Remote monitoring

'with the "Total Care" program, Piller simply takes care of everything'



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