GENPOWER

In collaboration with

PILLER
Power Systems

Nothing protects quite like Piller

PILLER GERMANY GmbH & CO. KG

PILLER DYNAMIC UPS

GENPOWER ELECTRICS LTD

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Piller UPS Capacity

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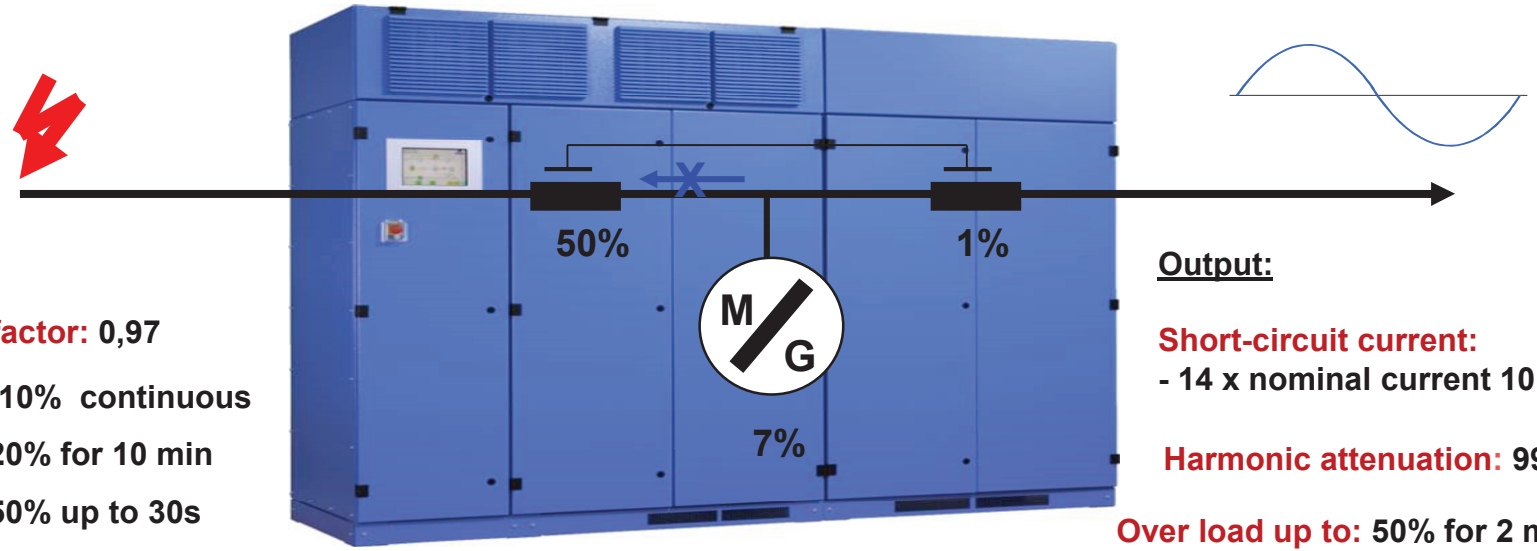
Piller Product range (Single unit capacity) is as follows:

1. **Static UPS** — 3 to 80kVA (AR Series) with Battery as back up
2. **Static UPS** — 100 to 500kVA (AP Premium series) Battery as back up
3. **UPS With Flywheel:** — 333 to 1200kVA (Active Power series)+ Genset as back up
4. **Dynamic UPS:** — 625 to 2500kVA (UNIBLOCK T+ series) With Flywheel or battery
5. **Dynamic Diesel UPS:** — 625 to 2500kVA (UNIBLOCK TD+ series) with Flywheel
6. **Static Transfer Switch:** — 25 to 1600A (APOTRANS Series)
7. **Frequency converter:** — 50/60Hz and50/400Hz (APOJET Series) Used for civil Aviation and Military application & Shore to ship

The Characteristics of Piller Rotary UPS



Input:

Input Power factor: 0,97

Voltage dip: -10% continuous

-20% for 10 min

-50% up to 30s

Harmonic attenuation: 99%

Output:

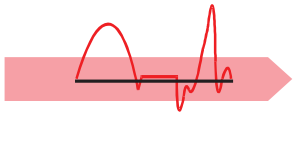
Short-circuit current:
- 14 x nominal current 10 ms

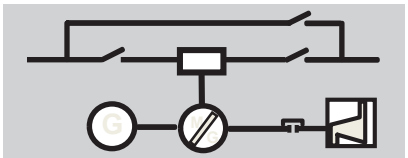
Harmonic attenuation: 99%

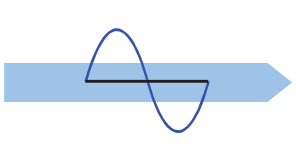
Over load up to: 50% for 2 min

Frequency Stability with100% Dynamic Load changes: ±1%

Disturbances in a power supply system







Mains disturbances

- Short interruptions ✓
- Total failures ✓
- Frequency fluctuations ✓
- Voltage fluctuations ✓
- Glitches ✓
- Harmonics ✓

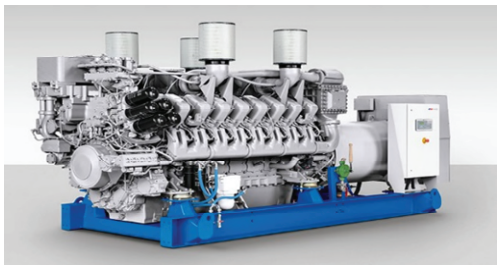
Load disturbances

- Load fluctuations ✓
- Unbalanced loads ✓
- Overloads ✓
- Harmonics ✓
- Peak currents ✓
- Short-circuits ✓

A power conditioning system must be able to handle all these disturbances, and continue to provide under all these conditions high quality power to the load.

UNIBLOCK™ UBT (D)+ with Genset Benefits

- Local engine / gensets supplier
- Gensets in MV while UBT+ in LV
- Free choice of engine brands, etc.
- Using of existing gensets
- Easy and independent extension (UPS and Gensets)
- Both supplies scalable ratings



Products Scope

CleanSource® Plus
SMS 300kW

PowerHouse

CleanSource® Plus MMS
300 – 1200kW UPS

CPM Modul-300/3600kW

GenSTART™

CleanSource® HD
625/675kW UPS

General Data CPM300/360
Key Data

General Data

Dimensions (W x D x H)	2450mm x 900mm x 1900mm 96,457“ x 35,433“ x 74,803“
Weight	3500kg / 7716lbs
POWERBRIDGE™ autonomy time	up to 20s @100% load

Operating Modes		Mains Operation	Generator Operation	Frequency Stabilisation	Voltage Stabilisation	Suppression
Mode 1	(VFI)	✓	✓	✓	✓	✓
Mode 2	(VI)	✓	✓		✓	✓
Mode 3	(VFD)	✓	✓			✓
Mode 4	(ERM)	Applies to all Modes 1-4				

VFI – Voltage & Frequency Independent
VI – Voltage Independent
VFD – Voltage and Frequency Dependent
ERM – Enhanced Redundancy Mode

Output

Power Rating	333kVA / 300kW @ 380V/400V/415V/440V 400kVA / 360kW @ 380V/400V/440V/480V
Frequency	50Hz & 60Hz
Power Factor	0,9 cap to 0 ind (w/o derating)

Input

Voltage	380V – 440V ±15% 480V -15% / +10%
Frequency (adjustable to max.)	50Hz – 60Hz ±1% (±10%)
Power Factor	0,99

Reduced site installation time

CPM 300/360 kW

Estimated fig.:

CPM = 2 man-days

Static UPS = 10 man-days

UNIBLOCK UBTD - Highlights

- Extremly high efficiency
- Leading and lagging output power factor without derating
- Unlimited crest factor and 100% load step capability
- Inherent fault clearing ability for short circuit faults without bypass
- Water cooling available using building chilled water
- 99% input/output harmonic isolation
- Redundant on-board power supplies
- Virtual unity input power factor
- Highest reliability
- Smallest footprint per kVA
- Totally flexible configuration options
- Medium voltage option available
- Choice of kinetic energy or battery storage

System Comparison

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Power Systems

9. **Practically free of mains distortion**
   no harmonic distortion fed back to mains (THD <2%), ideal sinus input current at normal operation (with static UPS systems, the input current shows a distortion factor of up to 35%)

10. **Low impedance, no filters and no capacitors**
    i.e. also for non-linear loads practically harmonic-free output voltage (static UPS systems have filters with capacitors).

11. **UNIBLOCK is self-ventilated**
    All static UPS are forced-cooled with many extra ventilators.

UNIBLOCK UBTD - Highlights

Feature	**Benefit**
Highest Efficiency	A truly green solution for high power applications, resulting in minimised losses and low running costs for your site.
Emission optimised starts	Reduced emissions, noise pollution and engine wear. Virtual elimination of false starts improves reliability and reduces fuel consumption. Reducing the environmental impact of your site.
Long ride-through without Diesel starts	Additional resilience as engine and ride-through can work independently for all brownout situations including glitches, sags, transients and surges and for most black-outs. Reducing the environmental impact of your site.
Power Quality Improvement	Compensation for low input voltage, including sags to 50% of nominal. Protects against brownouts (-30%) without using stored energy. Handles 100% non-linear loads. Exceptional step load response. Stable output frequency during engine operation including 100% load changes. Reducing the risk of failure to your site.
Harmonic Attenuation	Bi-directional isolation of harmonics between load and supply, without capacitive filters. Reducing failures and replacement item costs for your site.

UNIBLOCK UBTD - Highlights

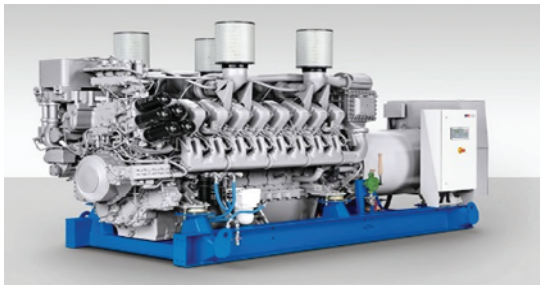
Feature	Benefit
Power Factor Correction	Isolation of poor power factor loads from the utility. Input power factor typically cos φ = 0.99 max. at full load. Elimination of the need for power factor correction capacitors. Reduction in power factor related energy costs and replacement item costs.
Design Flexibility	The same concept can be used to address low and medium voltage applications, cooling can be by air or chilled water, ride-through storage can be batteries or flywheel, critical and emergency supplies can be isolated or combined in a single distribution system. Diesel start delay can be varied from seconds to minutes. Multiple engine designs can be accomodated.
System Reliability	Capacitor-free design eliminates the highest failure components. Durable rotary technology is less sensitive to overloads and electrical disturbances. Simple system, no brushes or slip rings or complex bearing arrangements. Seamless, low stress power transfer to and from the engine. Reduces the number of failures and future proofs your site against changes in load profile.

UNIBLOCK UBTD- Highlights

Feature	Benefit
Special alternator/choke characteristics	High fault clearing capacity for system co-ordination. Bridging of upstream brownouts without disconnection from the input. Reducing the risk of failure.
Highest module power	Maximised net to gross building space. Lowest capital cost for super- high density applications. Reduced maintenance costs.
Bi-directional storage (Powerbridge)	Superior frequency stability on both load acceptance and rejection thereby reducing problems to your critical loads.
Simple maintenance	No complicated and prolonged overhaul requirements. Minimises risk and cost.
Optimized design	Lower Total Cost of Ownership.

View of System arrangement / components in Opening Panel

UNIBLOCKT+ with battery



UNIBLOCKT+ with POWERBRIDGE

UNIBLOCK™ UBT+
with Standby Generation

POWERBRIDGE

Utility

UNIBLOCK
machine

Critical Load

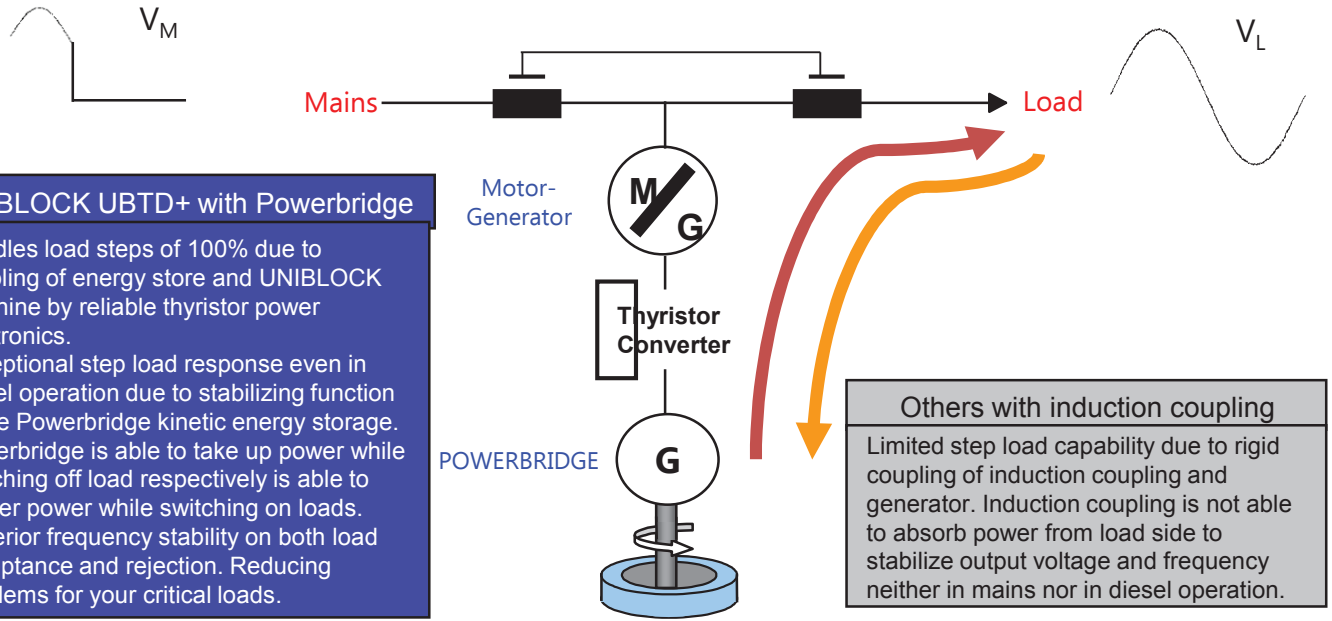
Genset

The UBT+ can easily be integrated into a system with separate standby generators to give long term ride-through.

What makes the difference?

Reversible function of POWERBRIDGE

Dealing with load changes:



UNIBLOCK UBTD+ with Powerbridge

Handles load steps of 100% due to coupling of energy store and UNIBLOCK machine by reliable thyristor power electronics.
Exceptional step load response even in diesel operation due to stabilizing function of the Powerbridge kinetic energy storage.
Powerbridge is able to take up power while switching off load respectively is able to deliver power while switching on loads.
Superior frequency stability on both load acceptance and rejection. Reducing problems for your critical loads.

Others with induction coupling

Limited step load capability due to rigid coupling of induction coupling and generator. Induction coupling is not able to absorb power from load side to stabilize output voltage and frequency neither in mains nor in diesel operation.