



Rotabloc Diesel Rotary UPS Systems



**Simply Reliable Solutions for
Continuous, High Quality Power**

Tradition. Technology. Innovation.



IEM Power Systems™ Rotary UPS is a fully integrated system comprising the Rotabloc™ Energy Storage Unit, Diesel Engine Genset, Switchgear, Control Systems, and Full Systems Integration.

IEM Power Systems is a subsidiary of Industrial Electric Mfg.™ (IEM), North America's largest, independent full-line manufacturer of electrical distribution and power quality equipment.

IEM Power Systems aim to provide the most reliable and efficient power protection system in the world. Our facilities in the U.S.A and Europe are complemented by global partnerships to provide operations worldwide with innovative solutions to ensure continuity of service.

We identified the need for a cost effective, highly efficient and extremely reliable UPS system to protect critical loads against interruption. This understanding has driven us to design and deliver a system that has a low TCO to serve customers who view continuous power for their facilities as a requirement rather than a competitive advantage.

What Is the Rotabloc UPS System?

The Rotabloc UPS is an electrically coupled diesel rotary UPS (DRUPS) system. The system is a "battery-less" UPS solution designed to protect critical loads against electrical disturbances in the event of power failures, voltage transients, or slow voltage fluctuations.

The simple design allows for low maintenance while maximizing efficiency, reliability and improvement of the overall power quality.

The Rotabloc UPS provides a complete turn-key solution for mission critical applications where continuous, high quality electrical power must always be available. IEM Power Systems offer Rotary UPS systems for both medium voltage (4160V and above) and low voltage (400V - 600V) applications.

Flexible Rotary UPS Solutions

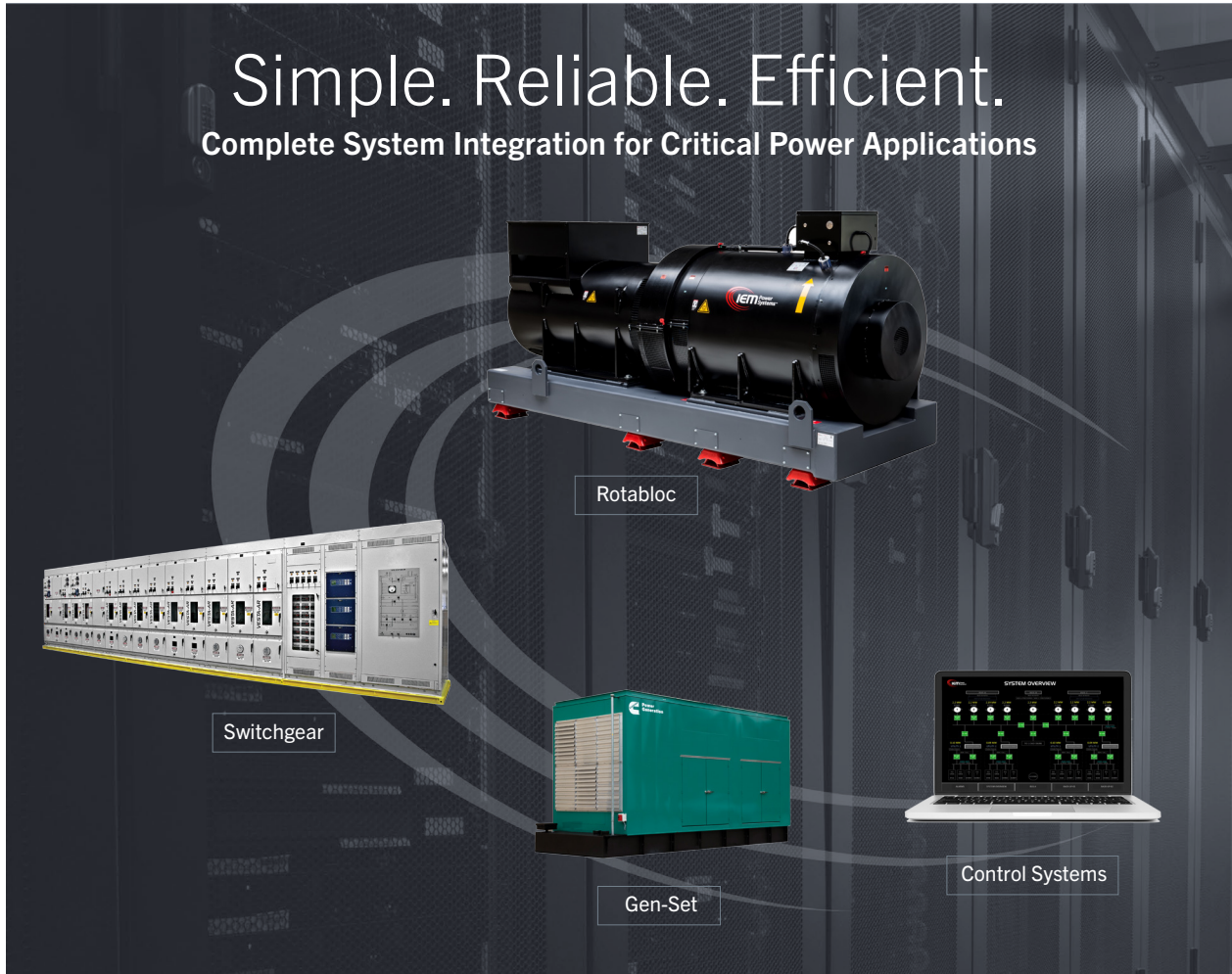
Rotabloc UPS Energy Storage Unit 400 - 2000kVA (320 – 1600kW)

Switchgear low and medium voltage input and output switchgear

Engine Generator can be remotely located and the RB system can utilize existing EG installations

Control Systems link each of the major components with the capability of being integrated into the facilities own BMS

Rotabloc Control System Integration software integration that allows the elements of the system to perform as a single effective unit



Rotabloc Unit (kVA)	Active Power kW	Unit Operating Efficiency	Rotabloc Dimensions			
			L (mm / ft.)	W (mm / ft.)	H (mm / ft.)	Weight (kg / lb.)
RBT - 400	320	94%	2895 / 9'6"	1080 / 3' 7"	1529 / 5'1"	7,850 / 17,307
RBT - 500	400	95.8%	2895 / 9'6"	1080 / 3' 7"	1529 / 5'1"	7,850 / 17,307
RBT - 500HP	500	96.5%	2895 / 9'6"	1080 / 3' 7"	1529 / 5'1"	7,850 / 17,307
RBT - 630	504	95.5%	3135 / 10'4"	1160 / 3' 10"	1524 / 5'	8,730 / 19,247
RBT - 800	630	96.4%	3135 / 10'4"	1160 / 3' 10"	1524 / 5'	8,730 / 19,247
RBT - 1000	800	96.8%	3225 / 10'7"	1200 / 4'	1570 / 5'2"	9,285 / 20,470
RBT - 1250D	1000	95.5%	(2x) 5618 / 10'4"	(2x) 1160 / 3' 10"	1524 / 5'	(2x) 8,730 / 19,247
RBT - 1600D	1280	96.4%	(2x) 5618 / 10'4"	(2x) 1340 / 3' 10"	1524 / 5'	(2x) 8,730 / 19,247
RBT - 1750D	1400	96.4%	(2x) 6058 / 10'7"	(2x) 1510 / 4'	1570 / 5'2"	(2x) 8,730 / 20,470
RBT - 2000D	1600	96.8%	(2x) 6058 / 10'7"	(2x) 1510 / 4'	1570 / 5'2"	(2x) 8,730 / 20,470

Rotabloc Rotary UPS System Overview

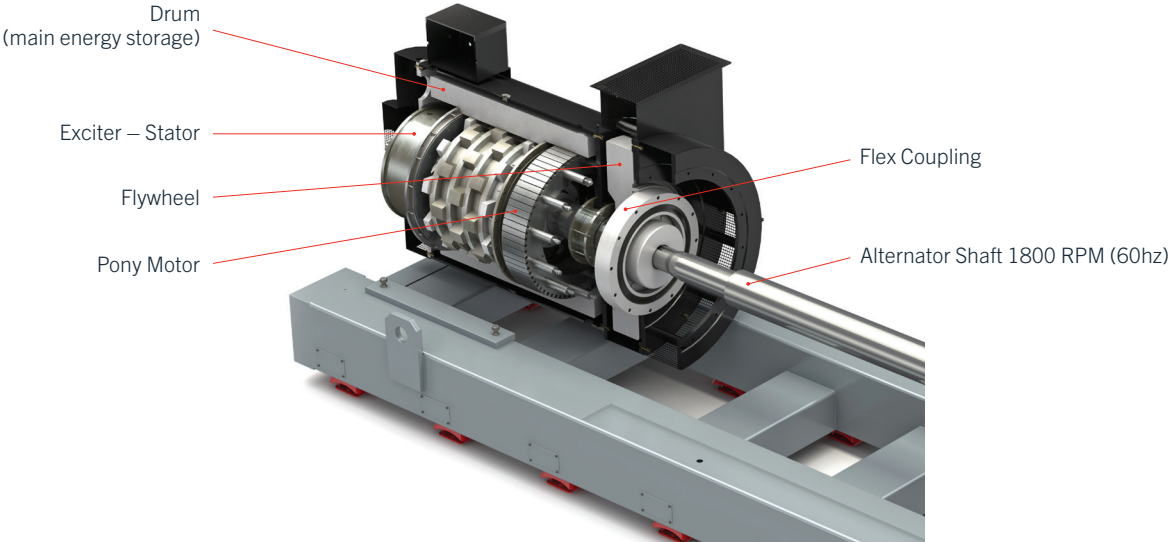
Rotabloc UPS Advantages

- Efficiently protects the critical No-Break and Short-Break loads
- Engine Generator can be operated and maintained independent of the Rotabloc UPS, supporting continuous running
- Lowest maintenance requirements for any UPS solution
- Flexible configurations for all applications up to 50MW+ in low and medium voltages and isolated parallel systems
- Very low TCO, minimal maintenance costs, high efficiency with no a/c requirement

Rotabloc UPS Features

- Standard Alternator with no special windings and easy to adapt to your requirements
- Low Speed Bearings with AutoLube extend system lifetime and reduce maintenance
- Electromagnetic Coupling for no maintenance, frictionless energy transfer
- Simple design using standard electrical and mechanical components lowers cost and increases reliability
- Patented drive motor maintains the optional speed, automatically matching the needs of the No-Break load to the energy stored by the UPS system
- Green technology – extremely recyclable, no a/c and very high operating efficiency – supports your facility's green credentials

RBT 1000 (800kW)



How Does Rotabloc UPS Work?

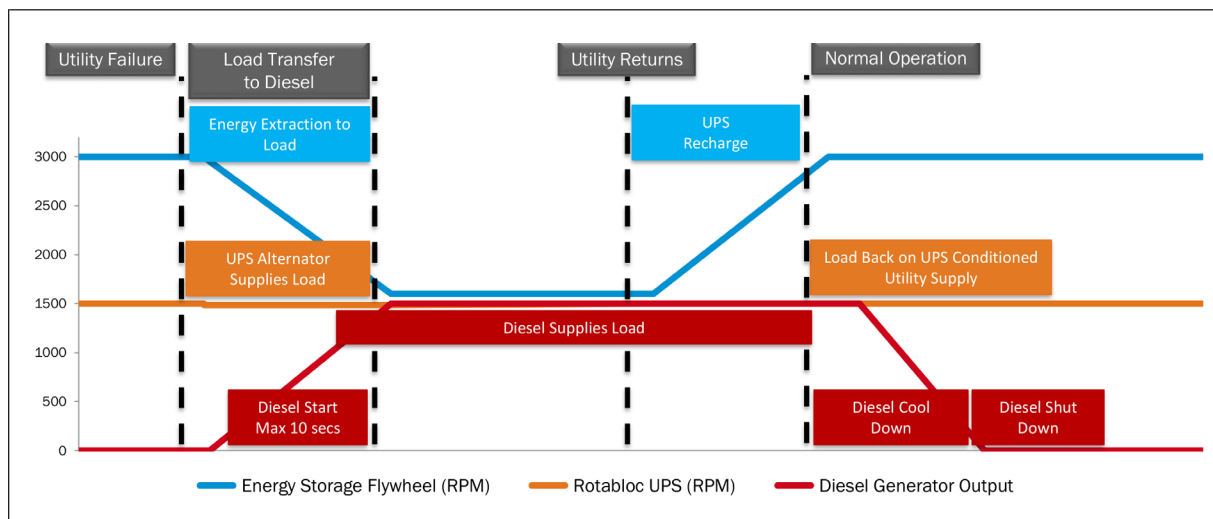
Rotabloc Rotary UPS systems are a unique 'Integrated' Uninterruptible Power Protection System incorporating the Engine Generator, UPS module, and Switchgear components, all of which are controlled by a central operating system.

The system is both simple in its design and in its mode of operation. To achieve this simplicity IEM Power Systems has developed the Rotabloc Power Control System that, while operating the UPS, also manages the operation of the Engine Generator ensuring that it:

- 1) Monitors the Utility supply for both voltage and frequency deviation
- 2) Quickly identifies a drop in input (Utility) voltage, responding within milliseconds
- 3) Starts and comes up to speed at the required rate
- 4) Synchronizes with the Rotabloc UPS
- 5) Accepts load in a controlled manner
- 6) Resynchronizes automatically to a returning Utility supply
- 7) Reconnects to the Utility in a controlled manner

The system Switchgear is also operated by the central control system ensuring that breaker operation always proceeds in the correct sequence and breaker sync check systems are UPS controlled so that your equipment is always protected.

Rotabloc System Operation



Note how, after a programmed 'hold' of up to one second, the Critical Load is transferred quickly from the failed Utility to the back-up Diesel Genset.

The 'hold' eliminates unnecessary diesel starts, reducing fuel consumption (and environmental impact), wear on the engine and the frequency, and cost, of diesel maintenance.

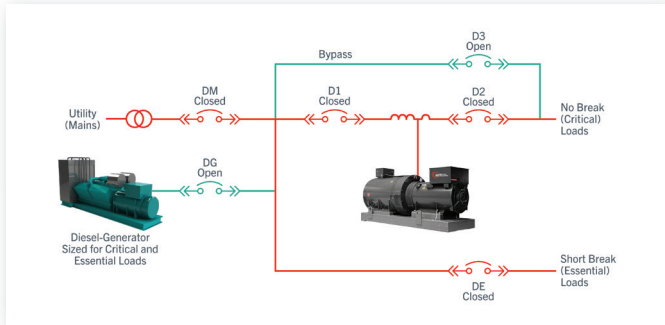
The Rotabloc control system then provides a 'soft', incremental handover of the Load without 'block-loading' the Diesel, improving reliability and reducing stress on the engine.

Once the Critical load is being supplied by the Diesel Generator, surplus DG output can be used to supply Essential (Short-Break) loads and/or recharge the Rotabloc 'flywheel'.

Once the Utility is restored, and the Rotabloc fully recharged, all loads can be transferred back to the grid.

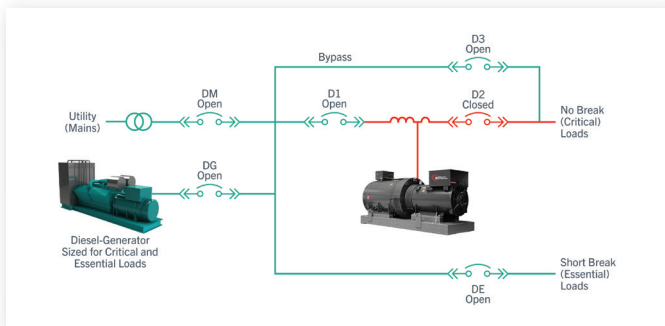
System Operation

Normal Operation



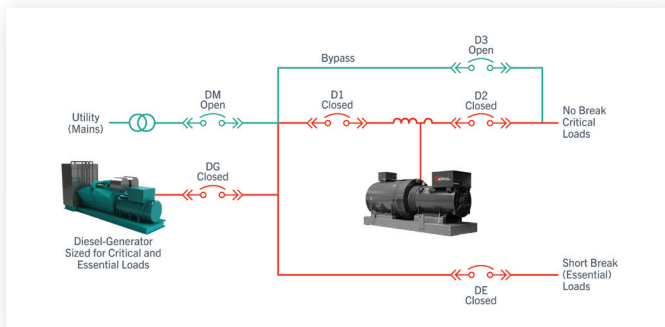
In Normal Operation, the Rotabloc filters the supply to the 'No-Break' loads and regulates the power factor at the Utility service input. This means that all equipment is protected against variations in power quality and assets that require continuous power are always secure from interruption.

Total Utility Failure



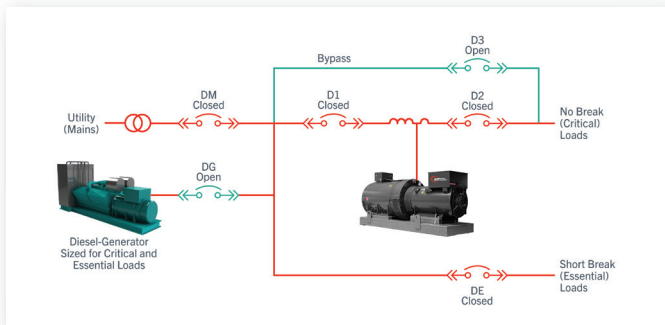
When the Utility fails, N1 and D1 open and the Engine Generator (EG) receives a 'start' signal. During the EG start period the Rotabloc discharges into the 'No-Break' load to maintain power, whilst the 'Short-Break' loads are disconnected. When the Generator comes fully up to speed, the diesel syncs with the UPS and then G1 closes. All 'No-Break' loads are maintained during this period.

Diesel Gen-Set



After a short period of serving only the 'No-Break' loads, Breaker D1 closes and reconnects the 'Short-Break' loads. The VFD then maintains the Flywheel at a fixed speed, or recharges it, dependent on EG rating. During this period all loads remain connected.

Return of the Utility



When the Utility supply returns, the VFD, via the drive motor of the Rotabloc, ensures that the Flywheel is recharged. Once the Rotabloc is fully charged, the Utility Breaker N1 closes and the load on the EG is reduced gradually before the Generator Breaker G1 is opened to disconnect the Genset. During this transfer all loads are maintained without a break.

Configurations

IEM Power Systems is committed to delivering the best solution to match your requirements. To accomplish this we design and build a wide range of configurations. Our design flexibility allows our clients to utilize a single module or arrange multiple modules in Parallel, Isolated Redundant, or Iso-Parallel configurations to fit with your facility's power requirements.

Alternative Energy Source Connection

IEM Power Systems has the capability to model your site-specific power distribution system. The Iso-Parallel Bus configuration allows the alternative energy source to be more effectively connected to the power distribution system. Isolation chokes can be sized so that the alternative energy source is fully utilized before drawing power from the external supply.

Containerized Applications

IEMPS offers containerized solutions for customers looking more toward modular units. Our containers are a standard ISO 40'. This application solution saves valuable internal space and makes power protection even more modular and scalable.

Medium Voltage

There is a growing recognition of the advantages of Medium Voltage (MV) systems in facilities with high power requirements. The benefits include: ease of power distribution, lower TCO, improved safety, reduced maintenance / greater reliability, improved flexibility in current and future power infrastructure and improved green credentials (lower embodied energy and lower energy usage).

IEM Power Systems can provide UPS systems that will support MV in your facility, providing high quality, continuous MV power to your operation. We are experts in Medium Voltage and can utilize IEM Vesta AR Switchgear, the leading MV solution for distributing power safely and efficiently throughout your building.

Our state of the art Jacksonville facility can test both LV and MV systems and we are the only UPS manufacturer who can fully integrate and test our MV solutions in the factory before shipping.

Control System Overview

Online Modes

- Power Factor Correction
- Harmonic Filter
- Transient Filter
- UPS/Discharging

Offline Modes

- Starting
- Charging
- Fault/Bypass
- Maintenance

Rotabloc Control System Features

- Real Time Control, Monitoring, and Reporting
- Remote Monitoring and Data Collection
- SCADA Server
- Fully redundant network topologies
- Protocols: DNP3, Modbus, Ethernet I/P, OPC
- Ease of integration with Building Management System

IEM Power Systems is the only UPS manufacturer that will build, integrate and test your system in the factory as standard

Service

IEM Power Systems provide dependable routine and responsive non-routine maintenance. Our engineers will work closely with you to provide high levels of on-going support for your facility. We provide our clients with a professional engineering team with global reach. We will be happy to discuss the maintenance requirements for your project and develop a tailored program for you.

Bearings - Auto Lubrication System

Effective lubrication of the bearing set, exactly when the bearings require it, not when the maintenance is scheduled, is essential to the health of every Rotary UPS. Our partnerships with bearing manufacturers have resulted in a simple, low cost solution for maintaining the condition of our bearings.

AutoLube provides exactly the right level of lubrication, in the right place at the right time. The system is installed onto the module and supplies all the bearings in the unit without needing to stop operations. Consumables are easy to monitor and replenish, prolonging the life of the bearings and reducing the need for routine and non-routine maintenance – maximizing uptime and minimizing costs.

Bearings - Whole Machine Protection

The Rotabloc can be equipped with vibration monitoring which diagnoses issues early, allowing proactive maintenance.



Rotabloc Critical Power Solutions

Critical Power Applications

Many facilities, in an array of industries, require high quality, electrical power to be continuously available during their operations. Facilities need to be able to manage change and where possible minimize their costs and environmental impact.

The efficient Rotabloc UPS meets these requirements now and in the future by ensuring that:

1. The voltage supplied to equipment is always within acceptable limits regardless of problems with the utility supply or issues downstream in the facility.
2. The UPS can accept a short circuit at its input terminal without interruption to the 'No-Break' loads whether these are motors, pumps or highly sensitive IT equipment.
3. Higher levels of protection can be created through use of parallel, isolated redundant or redundant units.
4. Expansion of your operation and its power system is supported through the inherent modularity and scalability of the Rotabloc system.
5. Efficient operation is maintained whilst fully protecting your facility's equipment. Rotabloc removes the need for eco-modes or by-passes that improve efficiency at the cost of protection.
6. Sustainable operations are supported by the high efficiency, recyclability and efficiency of the UPS system. These benefits also mean that Rotabloc UPS helps to shield your organization from green taxes and future increases in energy costs.
7. Maintenance is simple, cost effective and can be planned to work with the schedule of your operation.

About IEM Power Systems

IEM Power Systems designs and builds advanced power control systems for mission critical and similar applications where continuous, reliable and efficient power is required.

IEM Power Systems provides unique solutions to meet today's demanding power requirements. In addition to fully integrated power systems, we also provide Low and Medium Voltage Switchgear and Integration Services for UPS Systems, CHP, On-site Power Systems and Renewables, Marine and Energy Storage Systems.



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