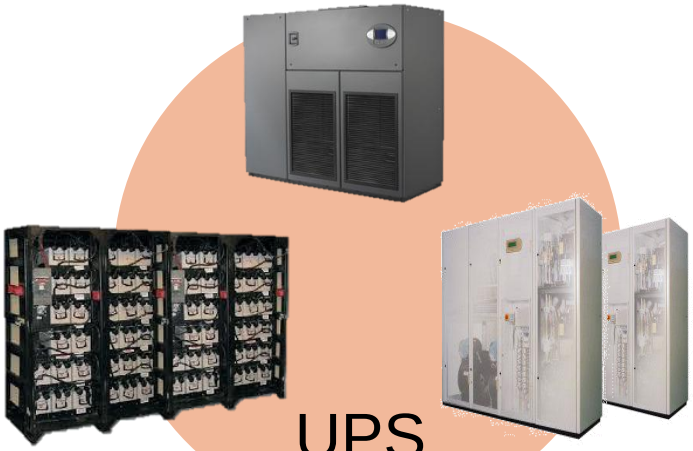
HITEC Power Protection

CONTINUOUS POWER IN YOUR CONTROL

DRUPS - WHAT IS IT ?

The complete and seamless mechanical integration of a UPS with a stand-by diesel generator set…



UPS

+

Genset

=

DRUPS

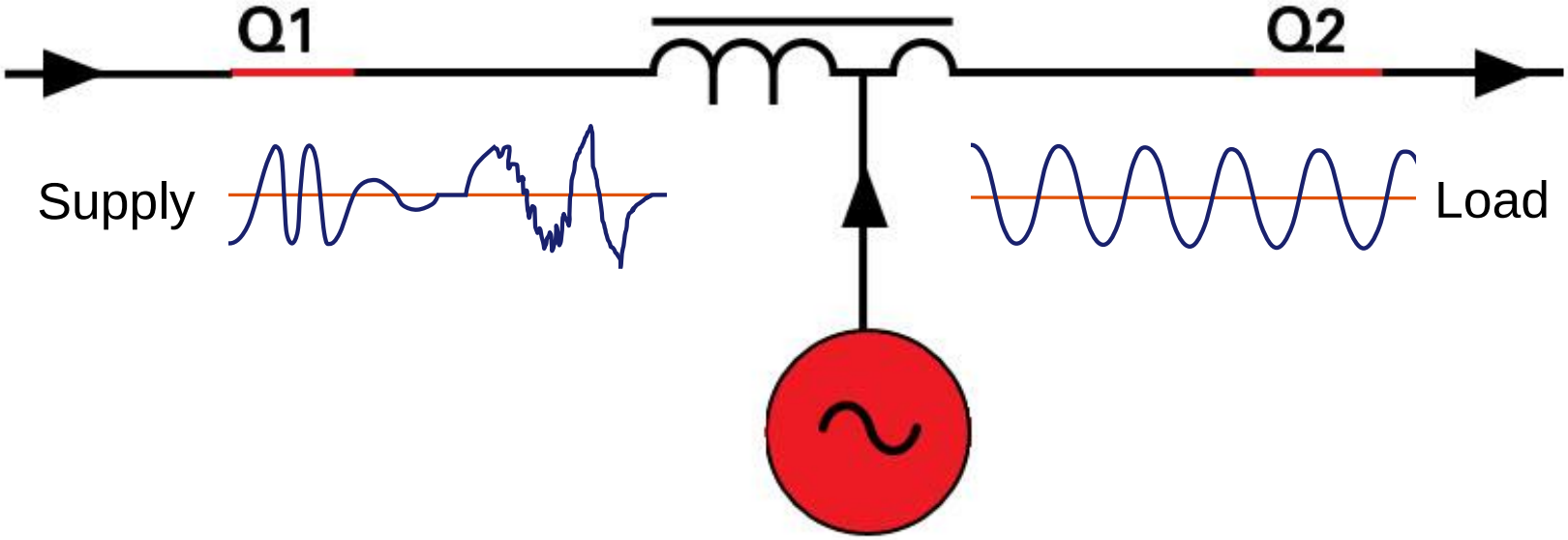
…but it’s not static – it’s dynamic!

battery (chemical) based energy storage

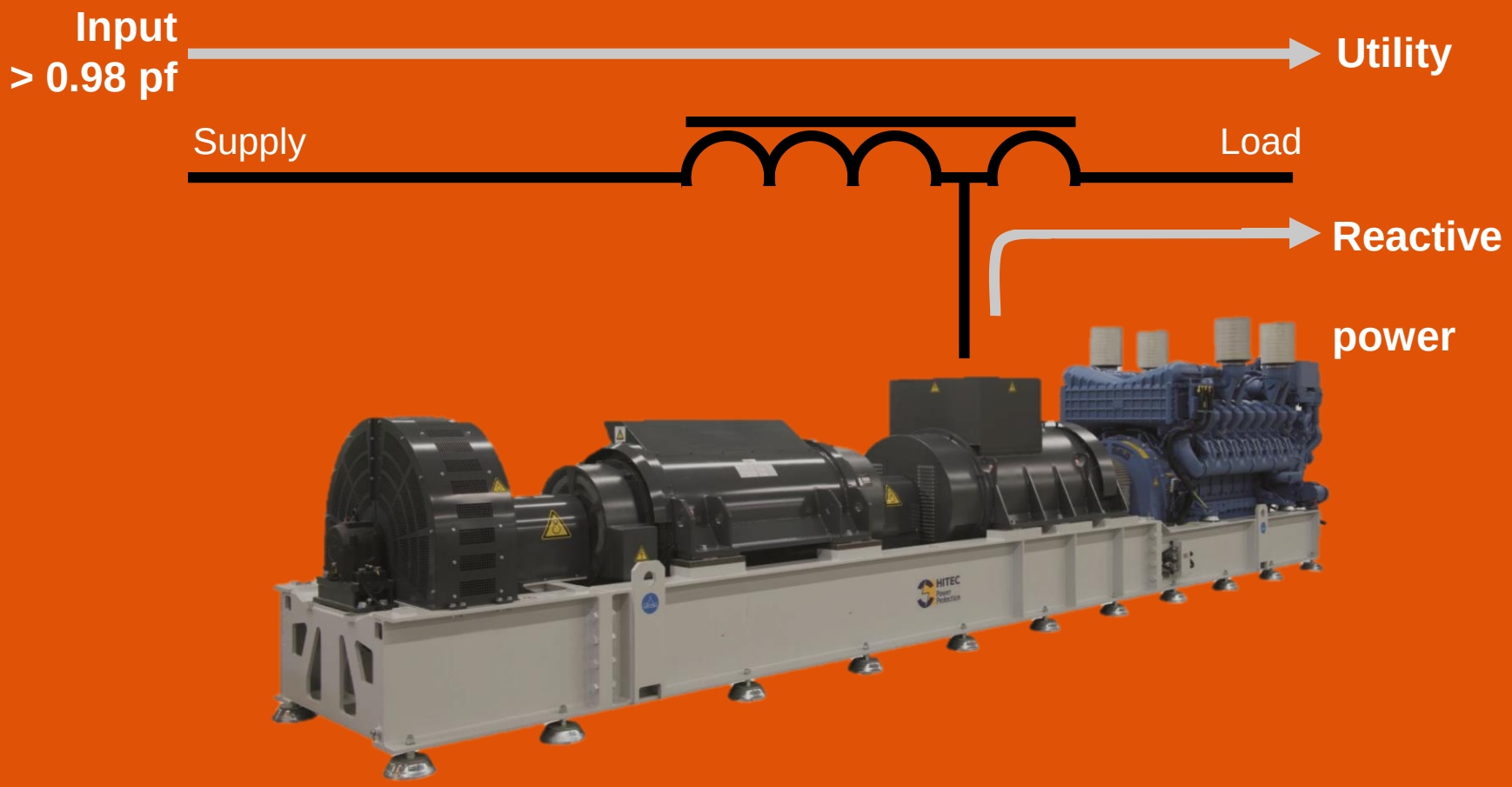
flywheel (mechanical) based energy storage

HOW DOES IT WORK ?

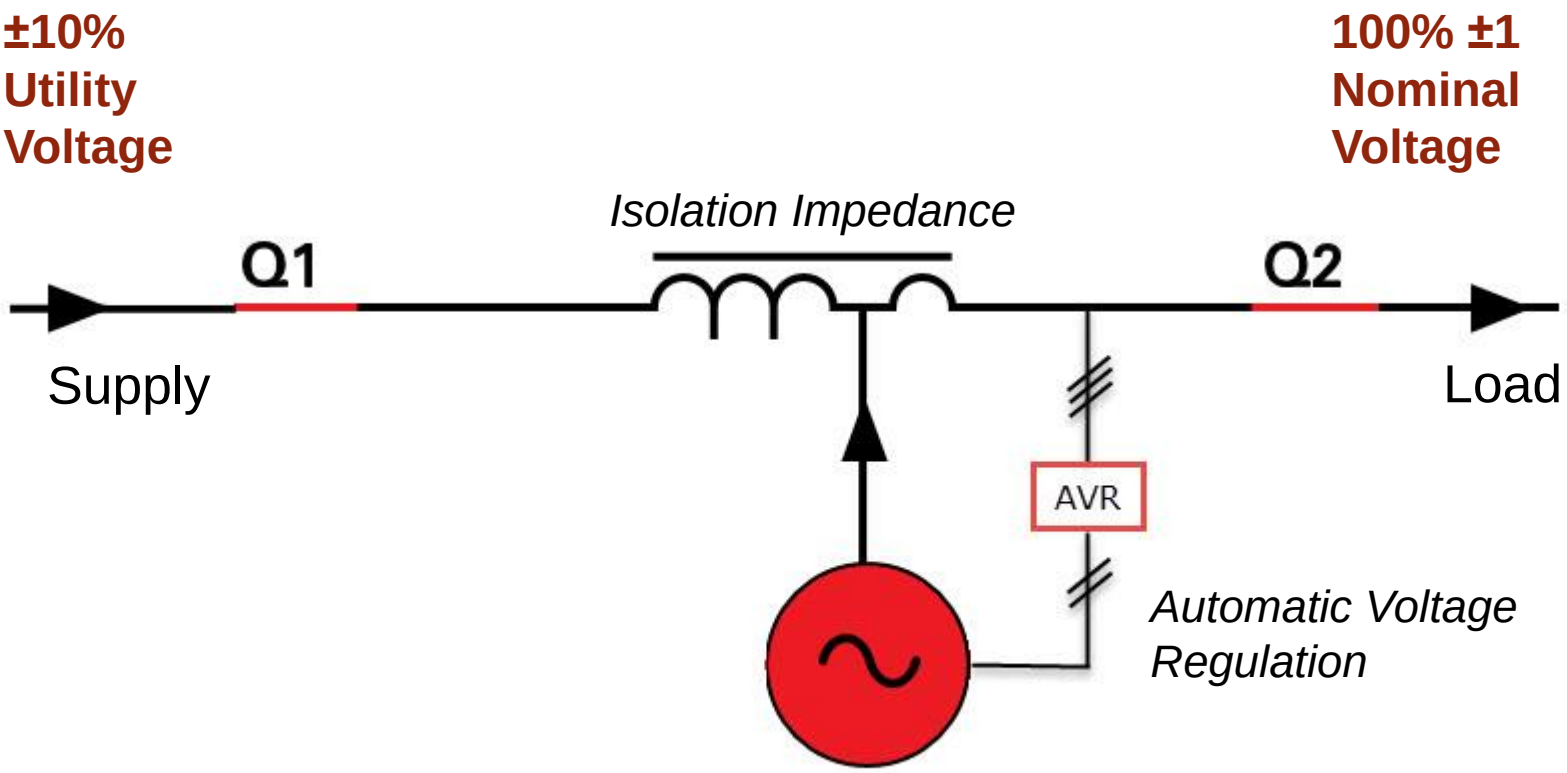
AS A POWER CONDITIONER


Q1
Q2
Supply
Load

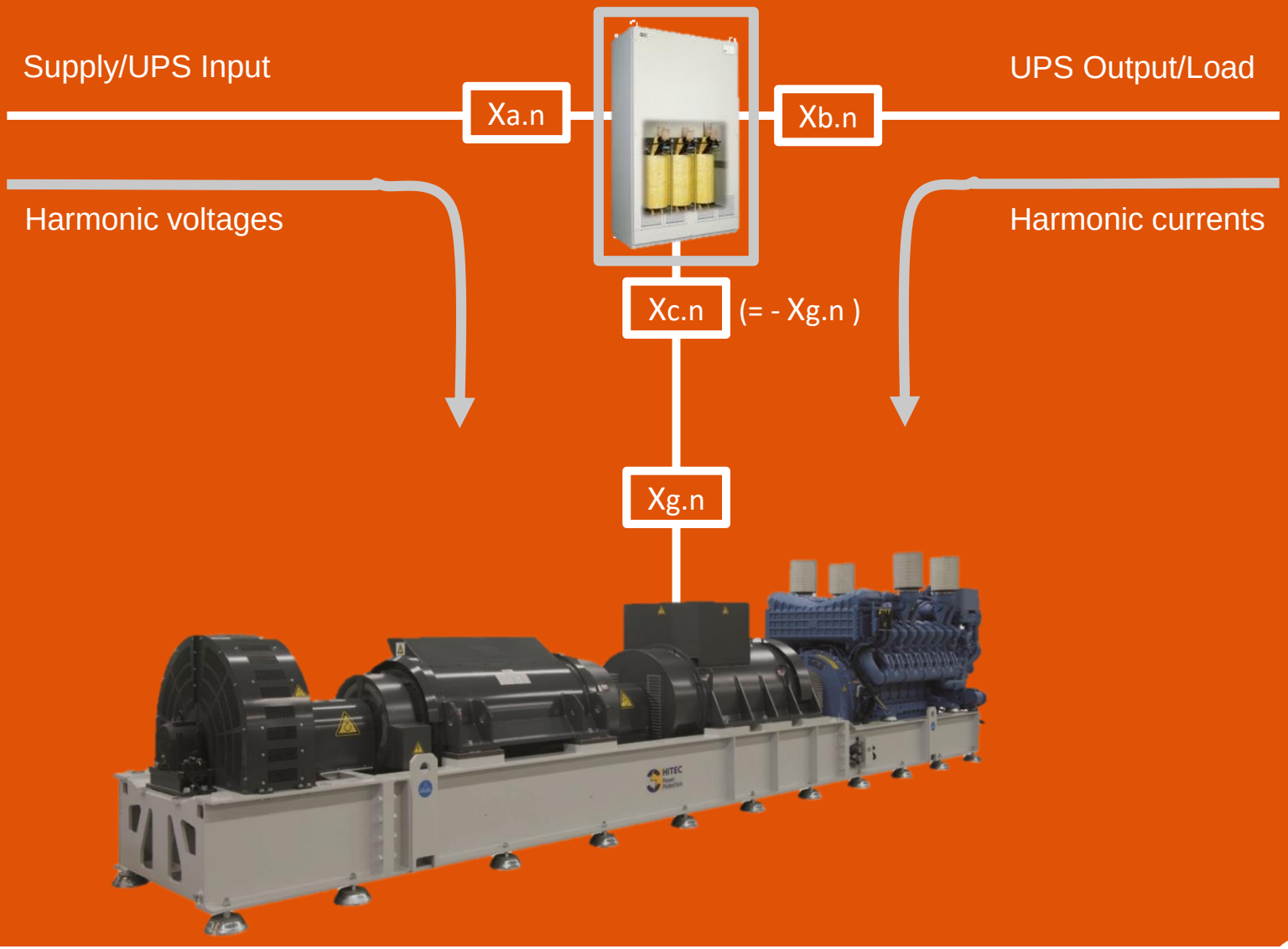
Power Factor Correction



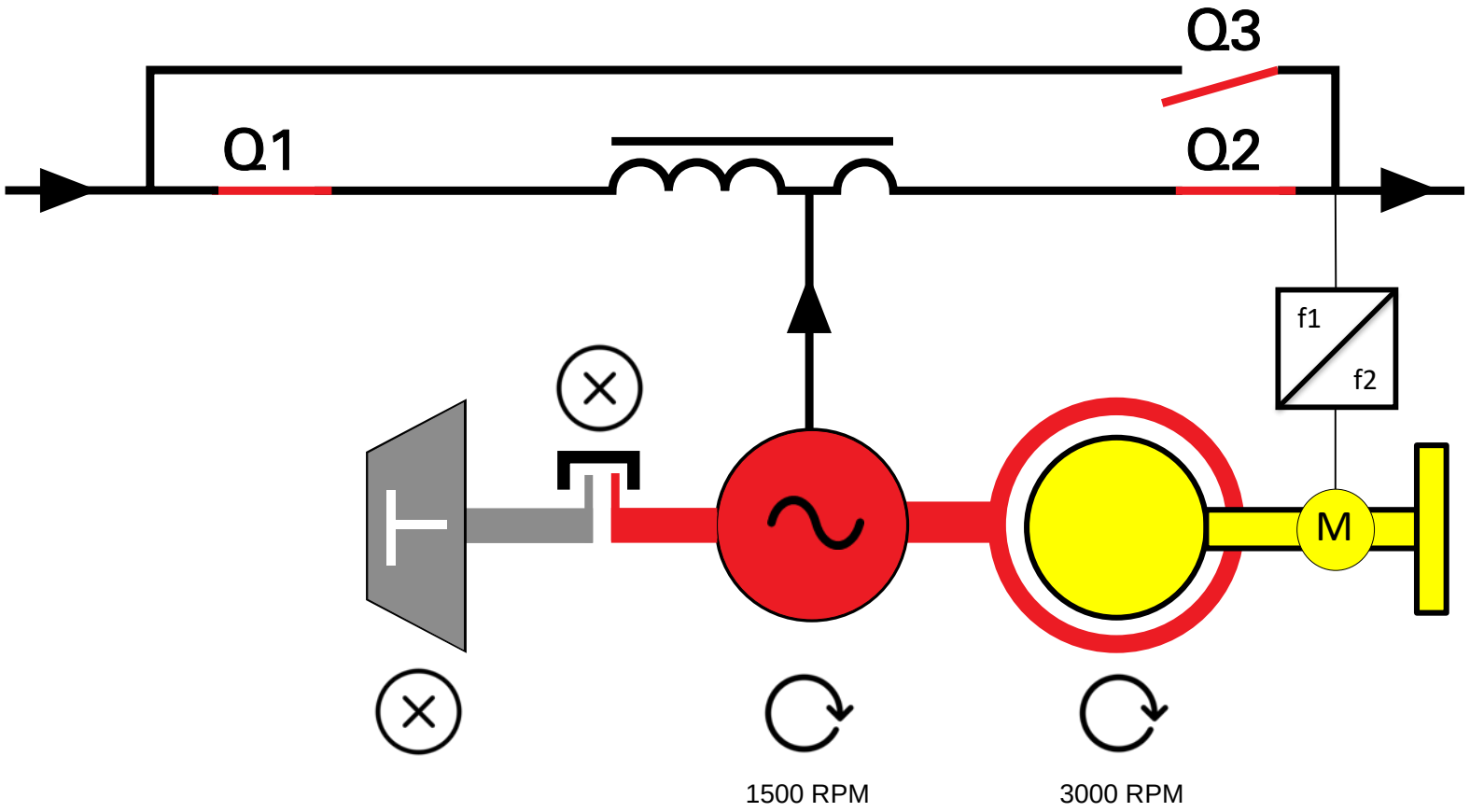
Sag/Surge Mitigation



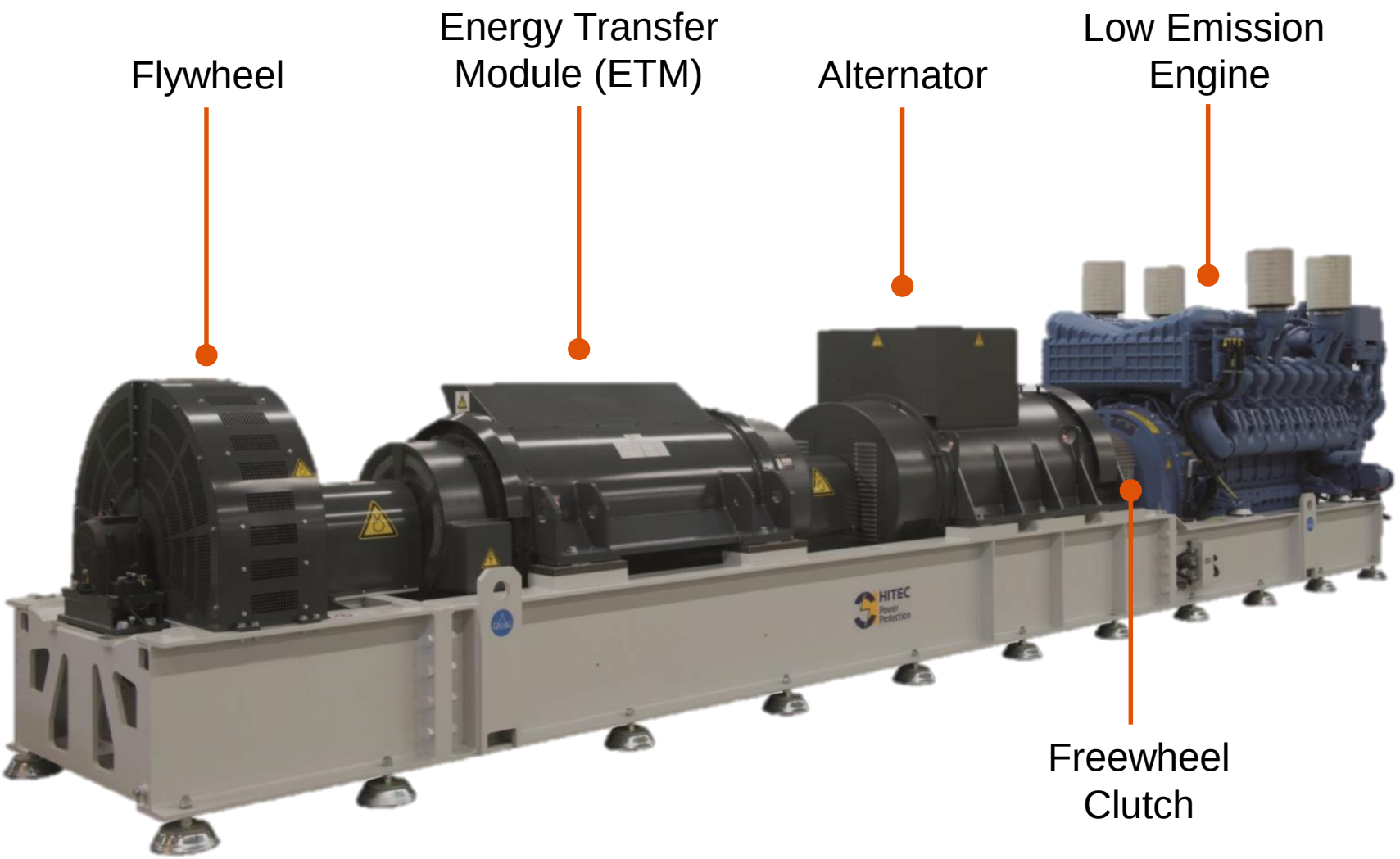
Harmonic Filtering



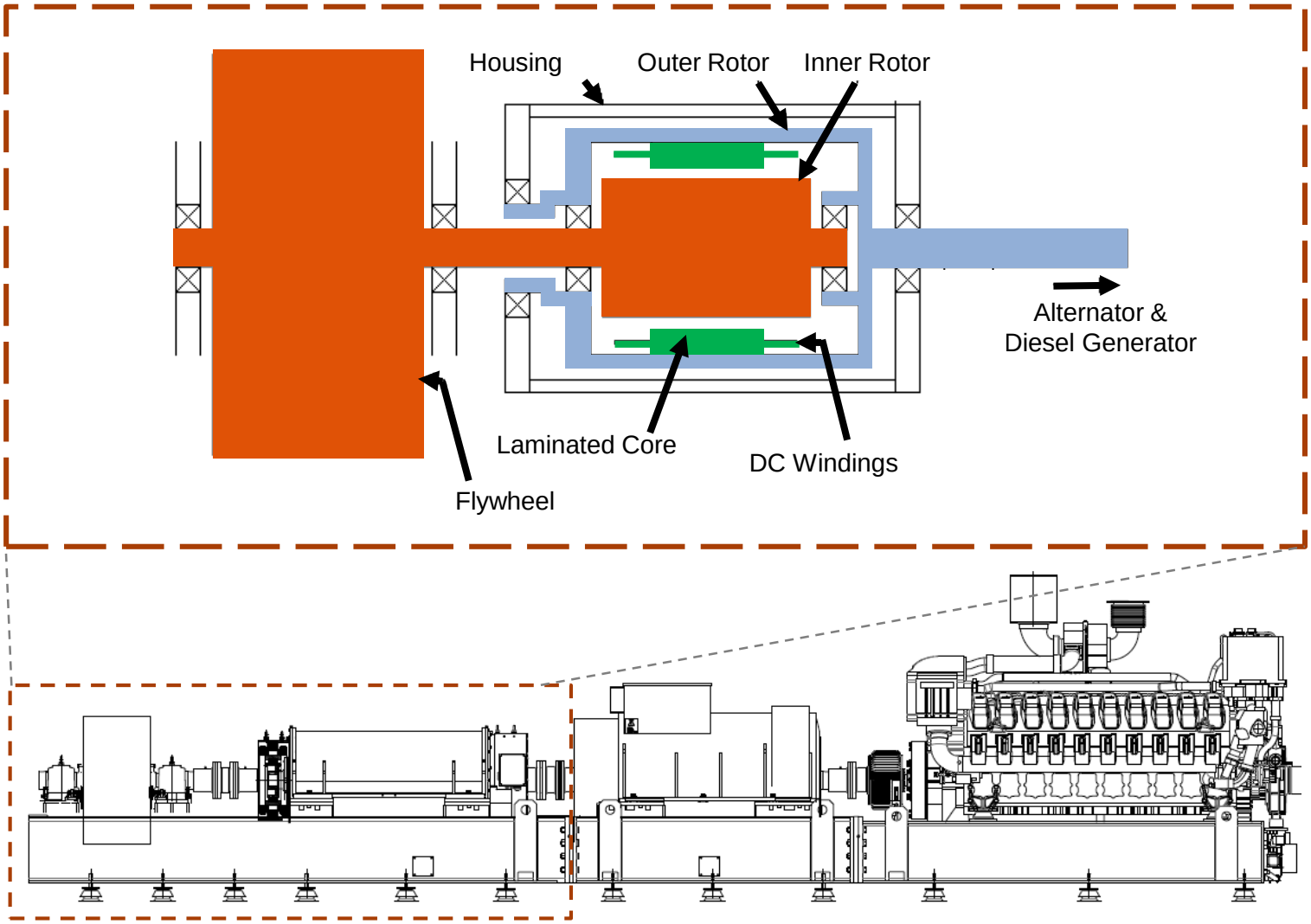
AS AN OUTAGE ELIMINATOR


Q3
Q1
Q2
f1
f2
M
1500 RPM
3000 RPM

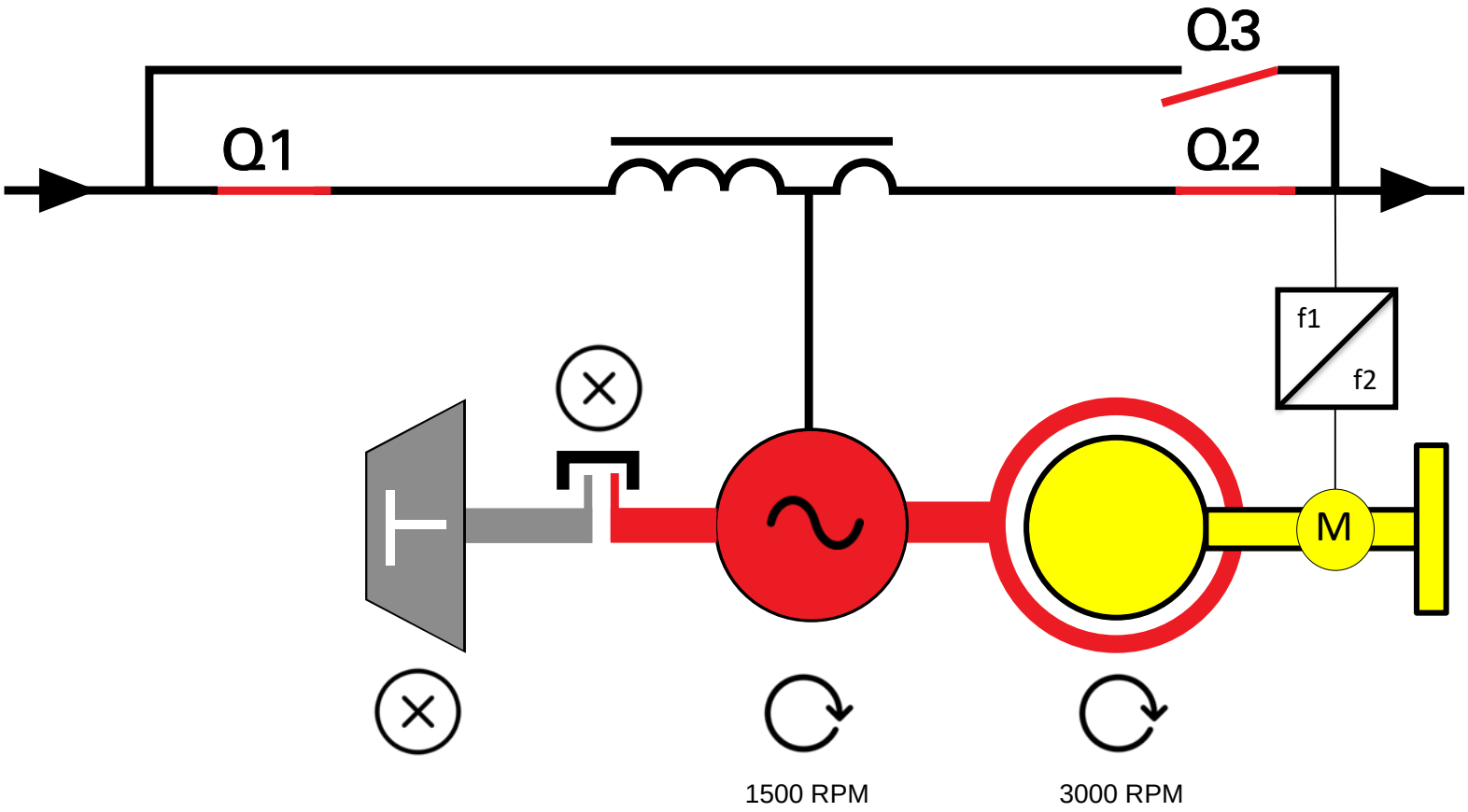
Power Module Components



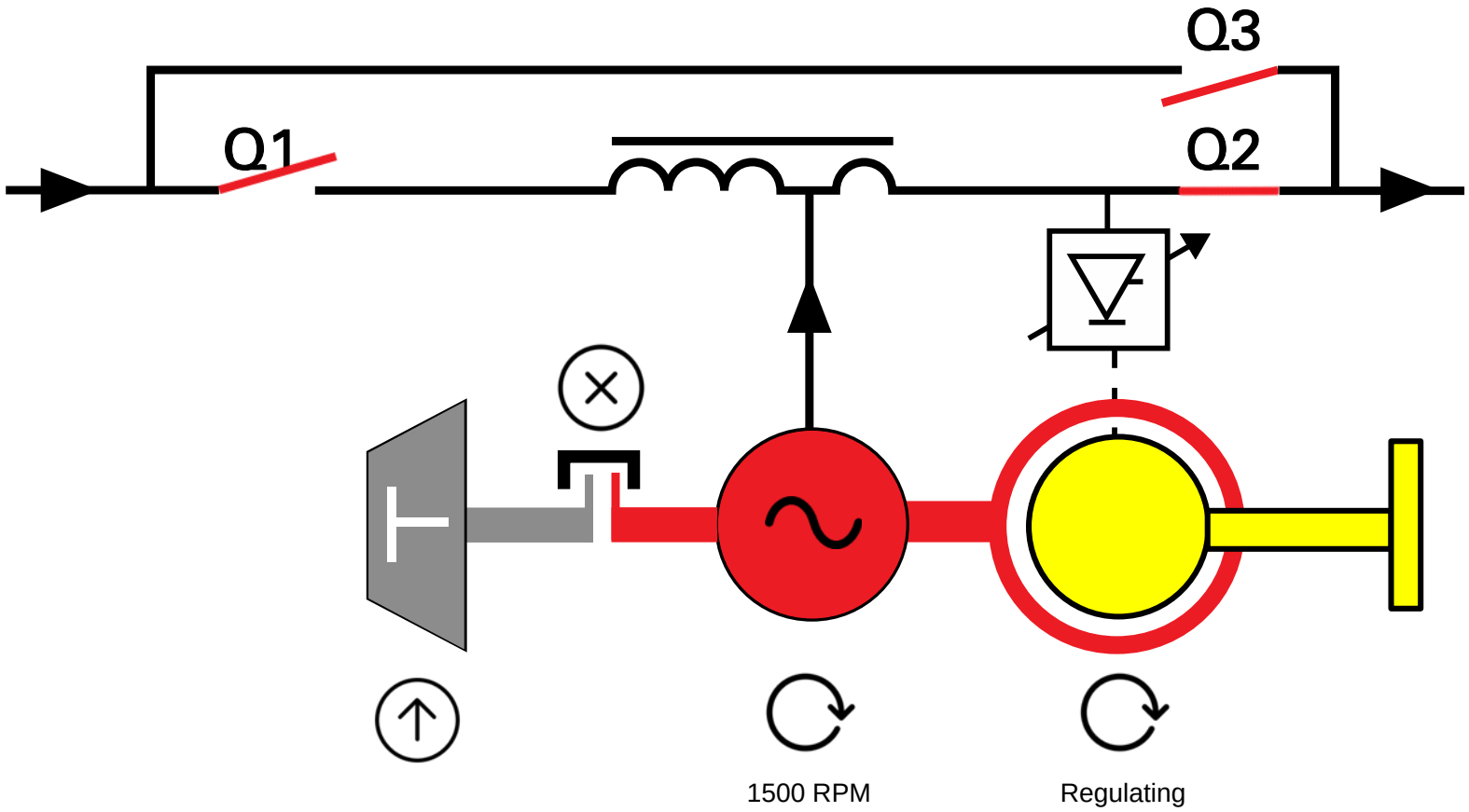
The UPS “Prime Mover”



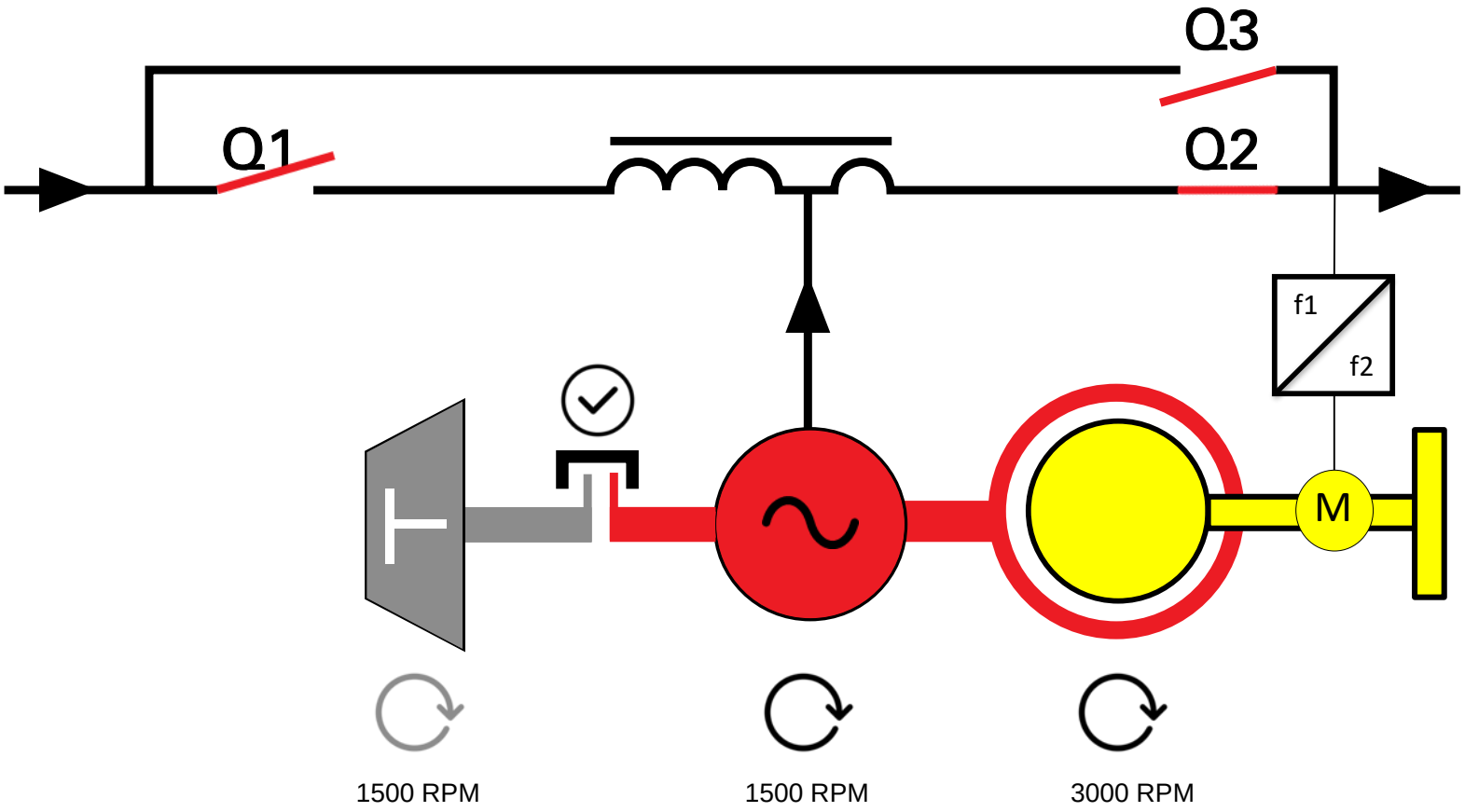
Conditioning Mode



UPS Mode

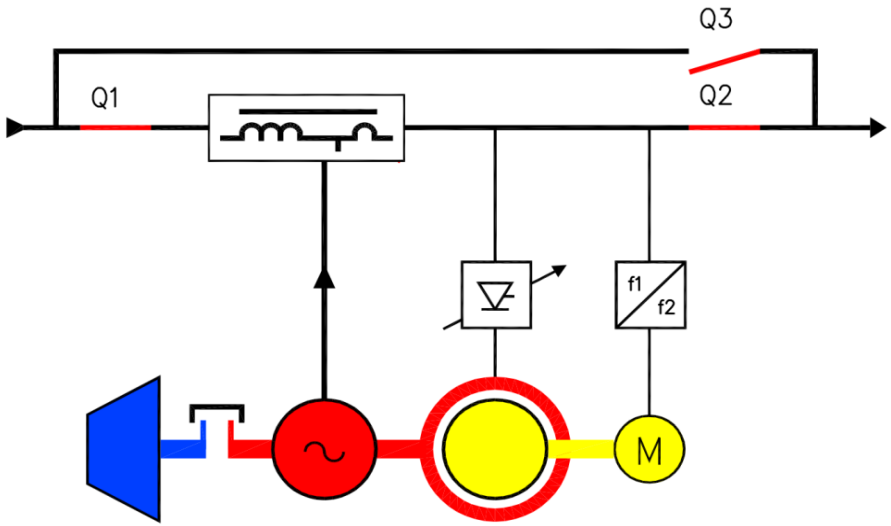


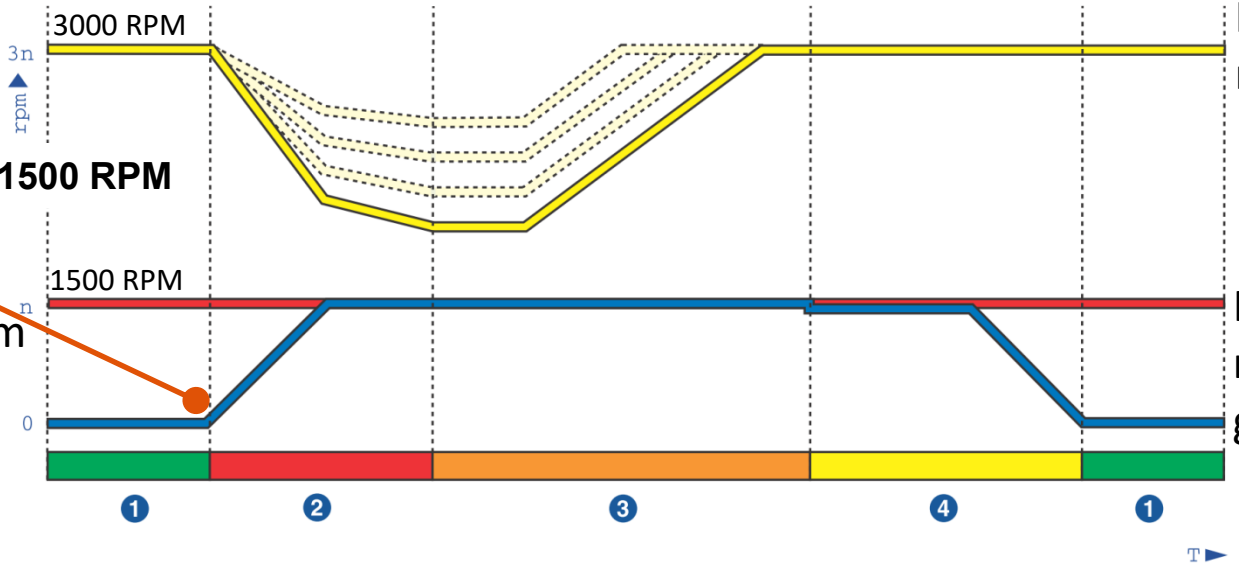
Diesel (Genset) Mode



In 2.5 Seconds From 0 to 1500 RPM How is that possible?

- 1 Utility mode
- 2 KEM flywheel mode + engine start
- 3 Engine / KEM flywheel mode
- 4 Cool down/shut mode
- 1 Utility Mode





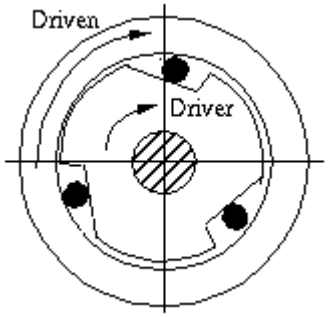
Utility failure:

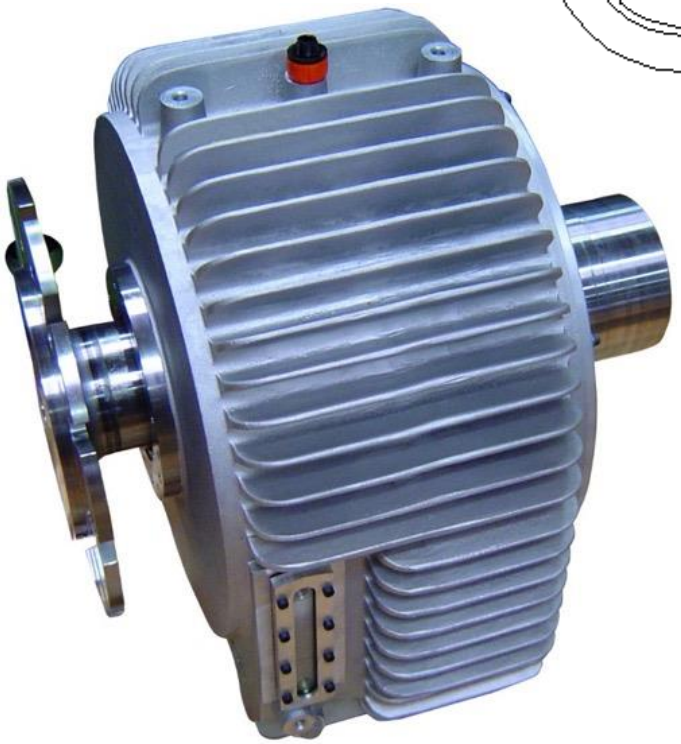
- Take energy from inner rotor
- Q1 open
- Start engine

About the Diesel engine

- Continuously lubricated
- Pre-heated
- No load at start up
- Up to speed in 2.5 to 3 seconds
- N+1 starter motors with rectified starter panels
- Gravity-fed day tanks
- Sized to load

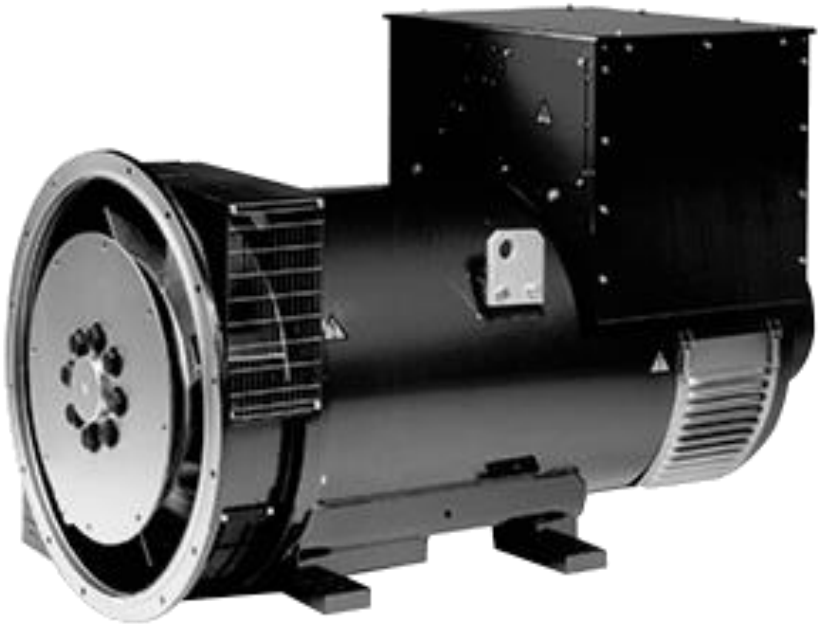
About the Freewheel clutch





- Fully automatic, single direction
- The relative rotational speed of the driving and driven parts determine engagement
- Integrated lubrication system
- Mechanical connection with engine
- No electrical controls
- Robust & Reliable

About the alternator

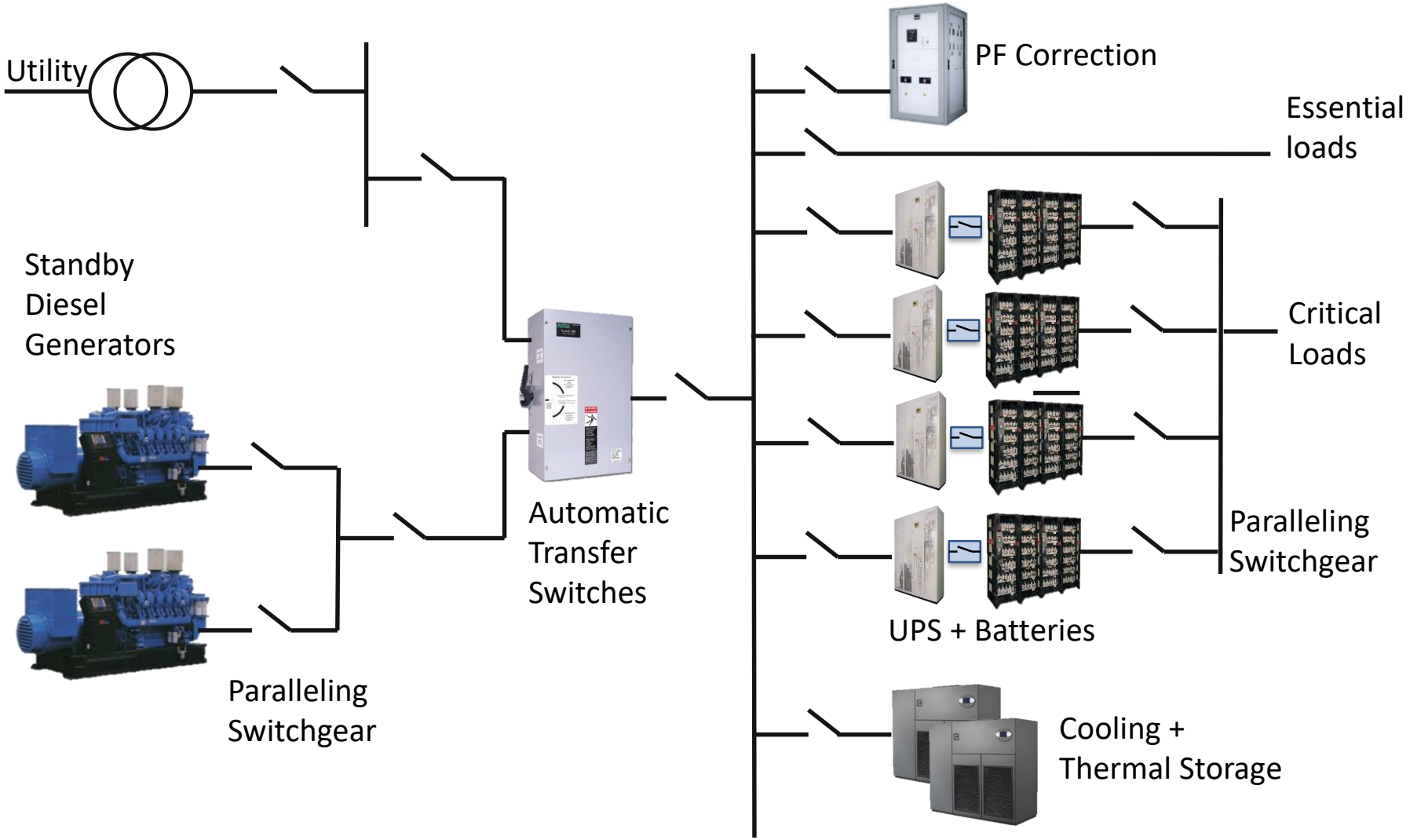


- Generates AC power
- Acts as a synchronous condenser that improves power factor
- Up to 50% oversized to system
- Up to 14 X Full Load Current
- Rotary can generate enough current to clear faults without going to bypass unlike Static UPS
- Very stiff source

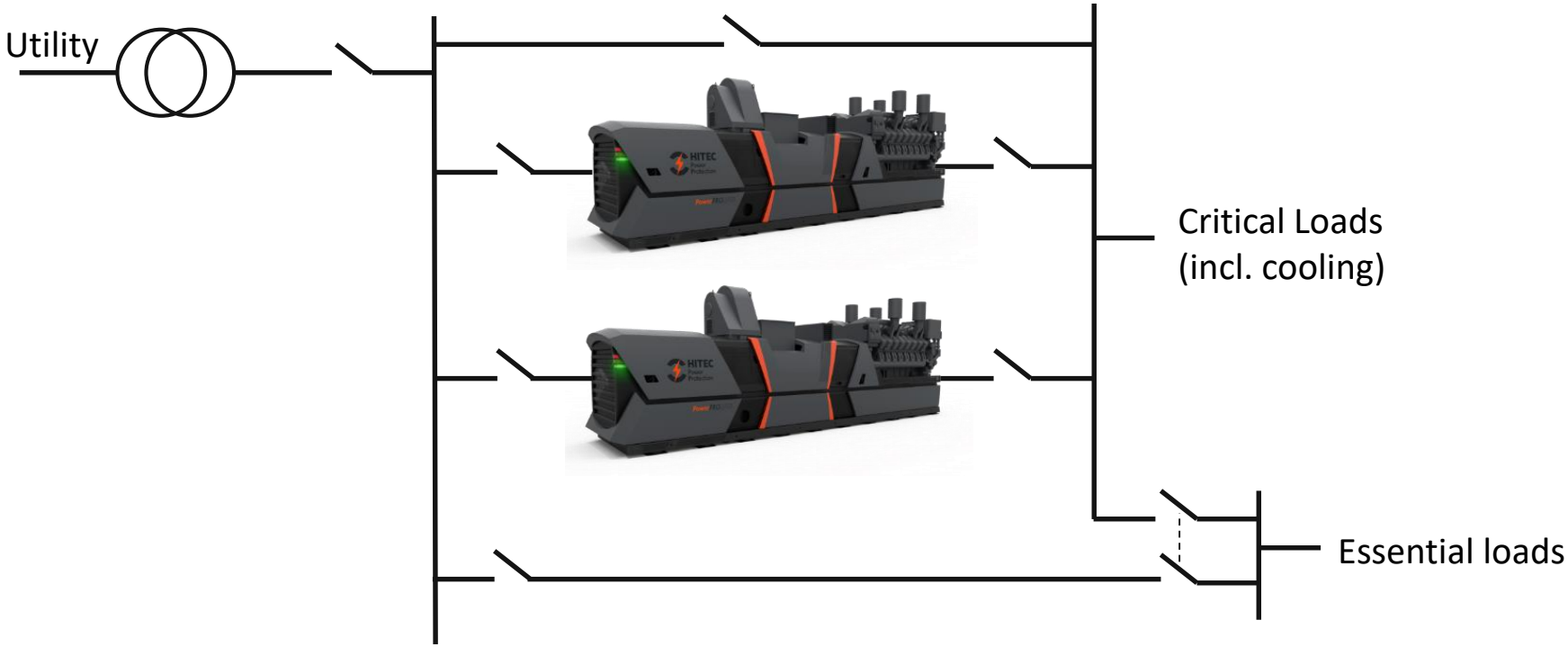
KEY BENEFITS OF DRUPS

30+ Year Life

Single-line diagram - Typical installation – Static UPS

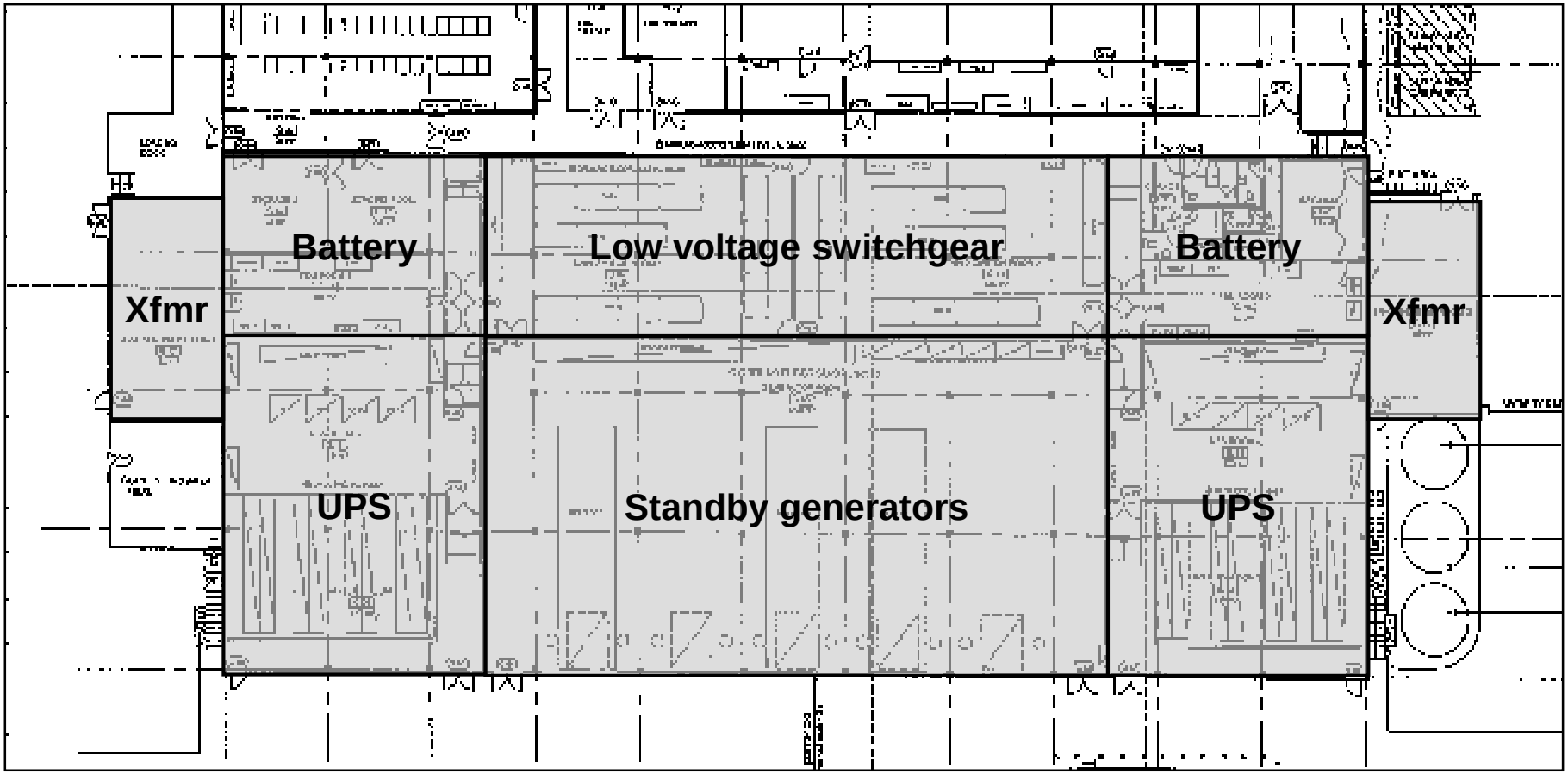


Single-line diagram - Typical installation – DRUPS

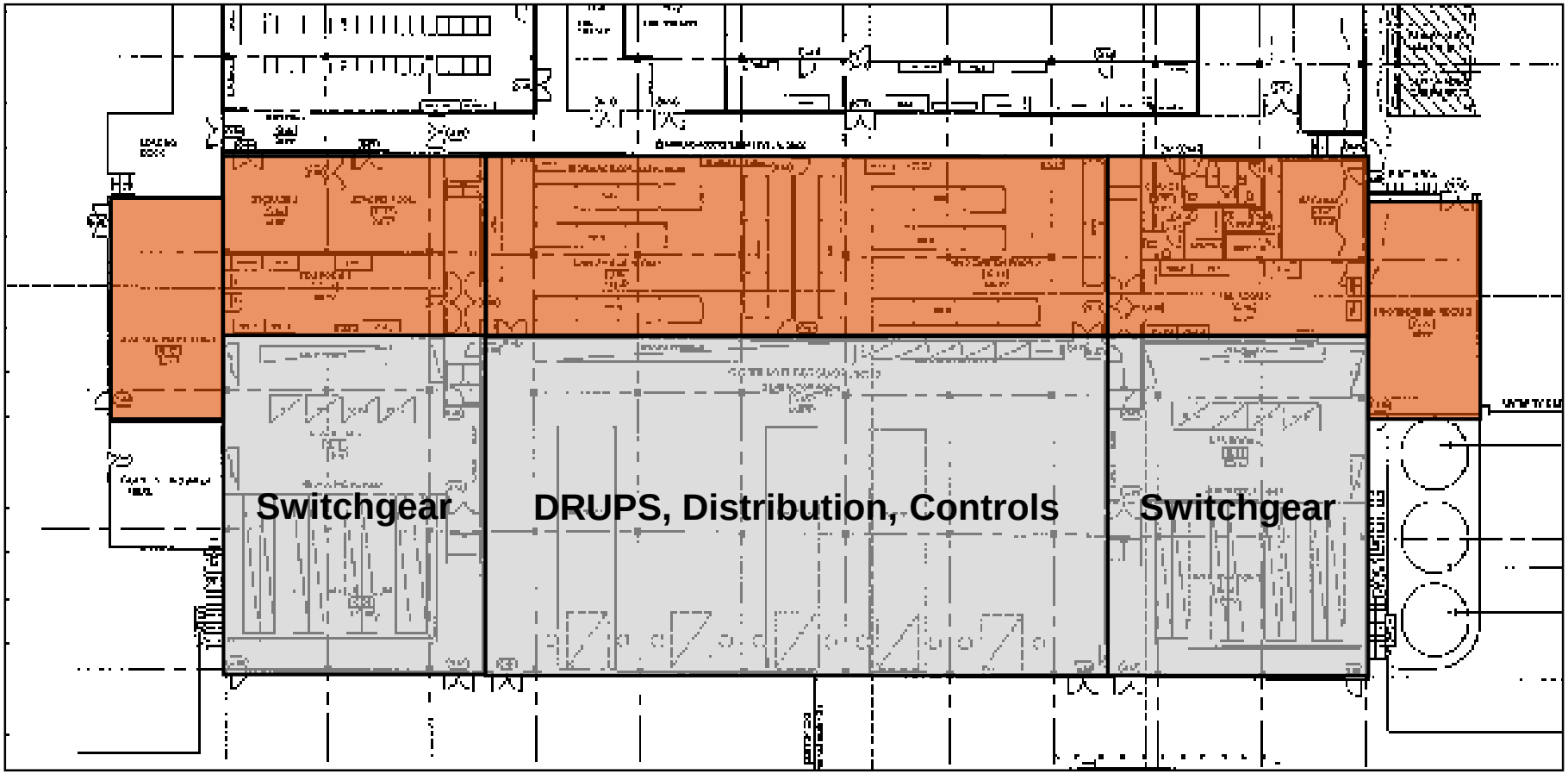


Simplification = Reliability

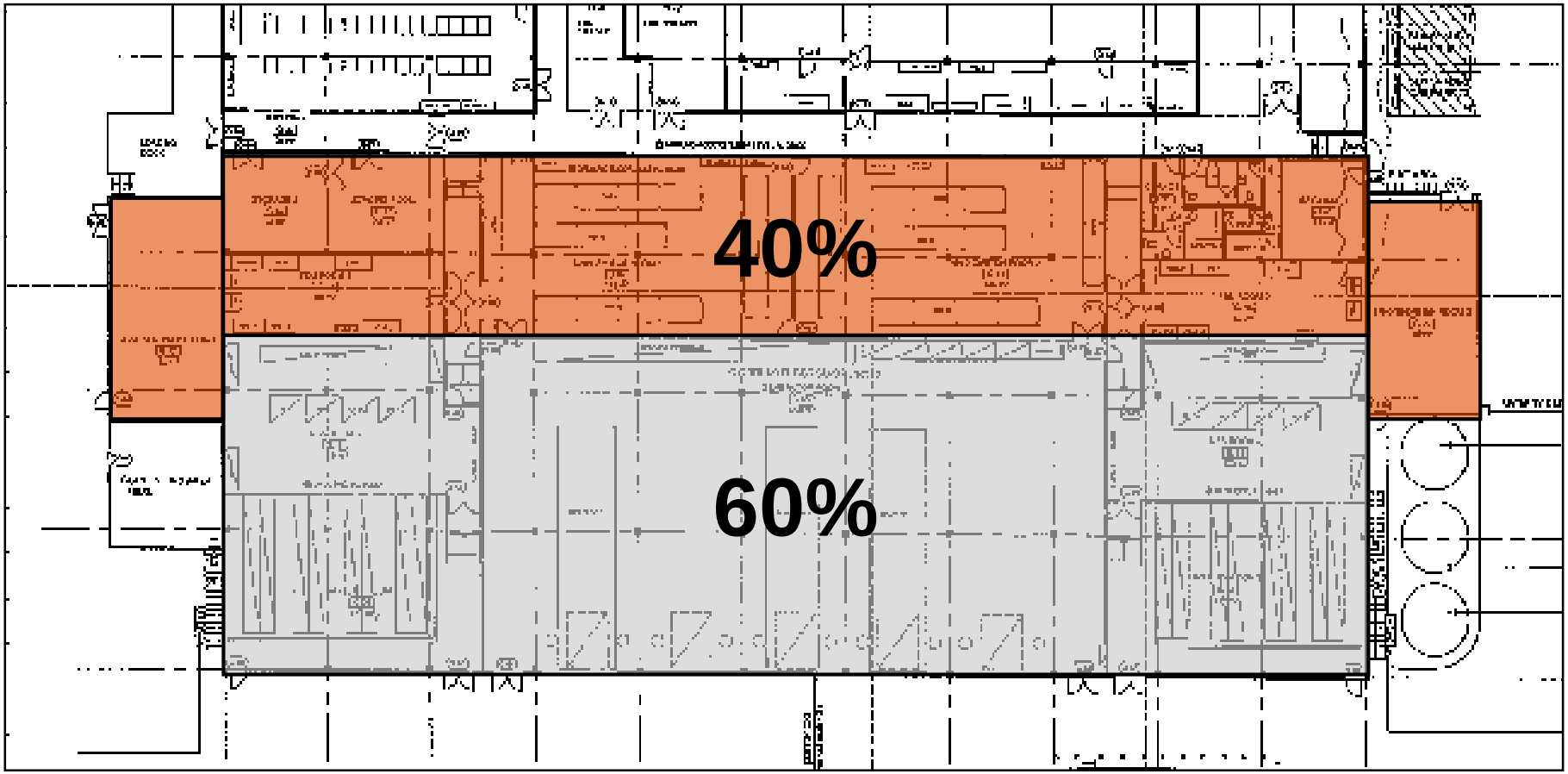
Space-Saving



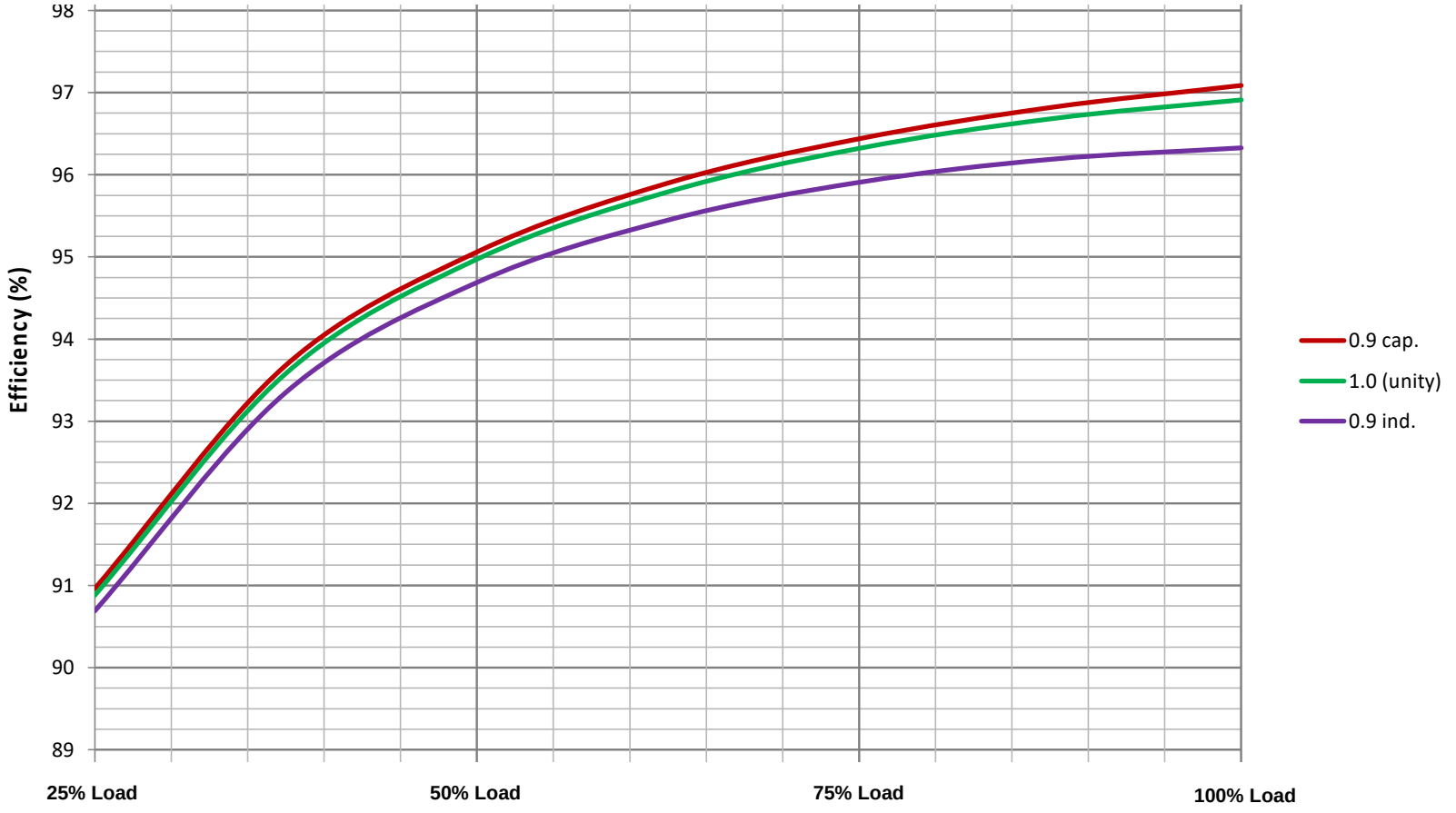
Space-Saving



Space-Saving



Highly Efficient



Highly Efficient

100%

97%

100%

Battery

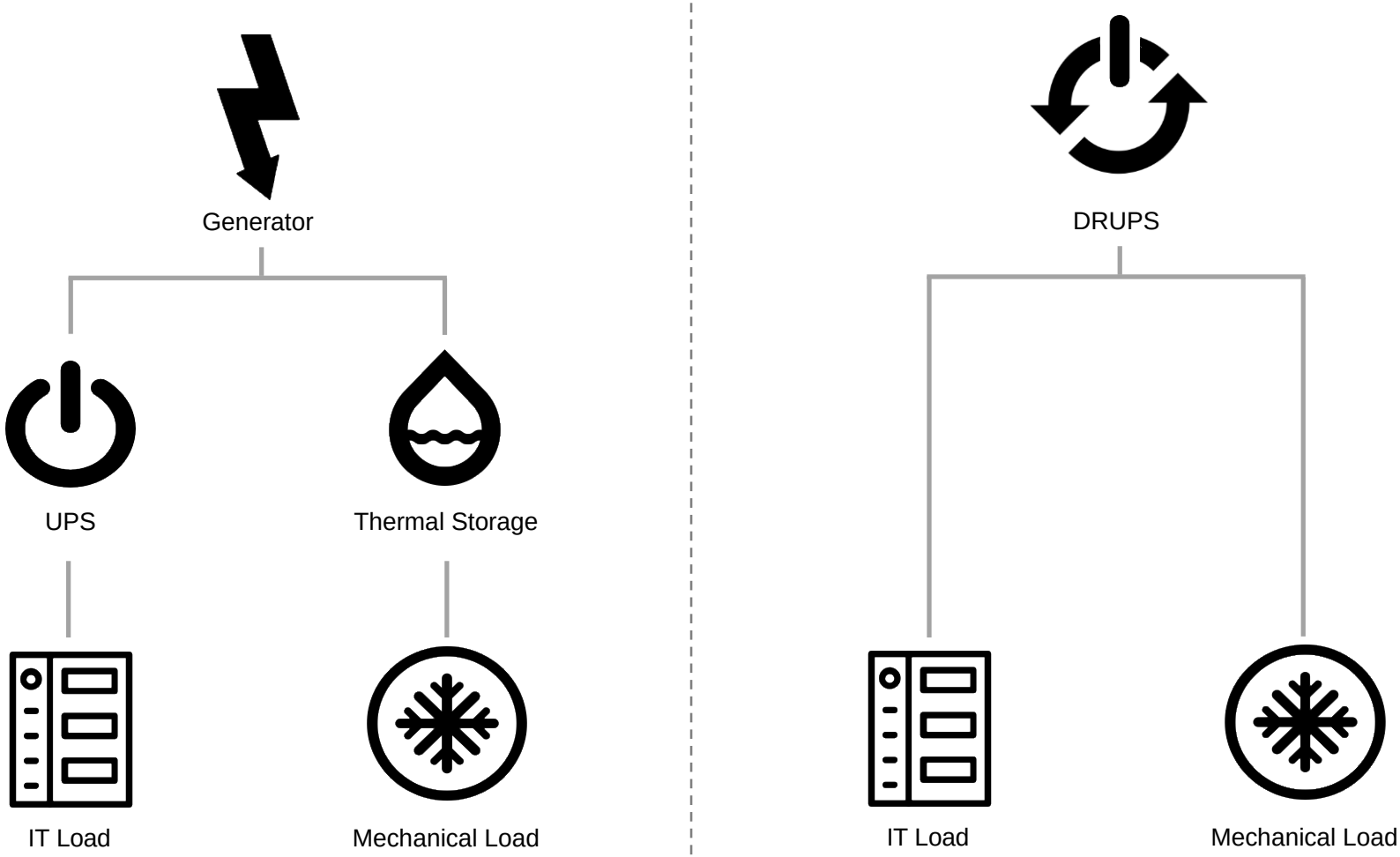
UPS

Air Conditioning

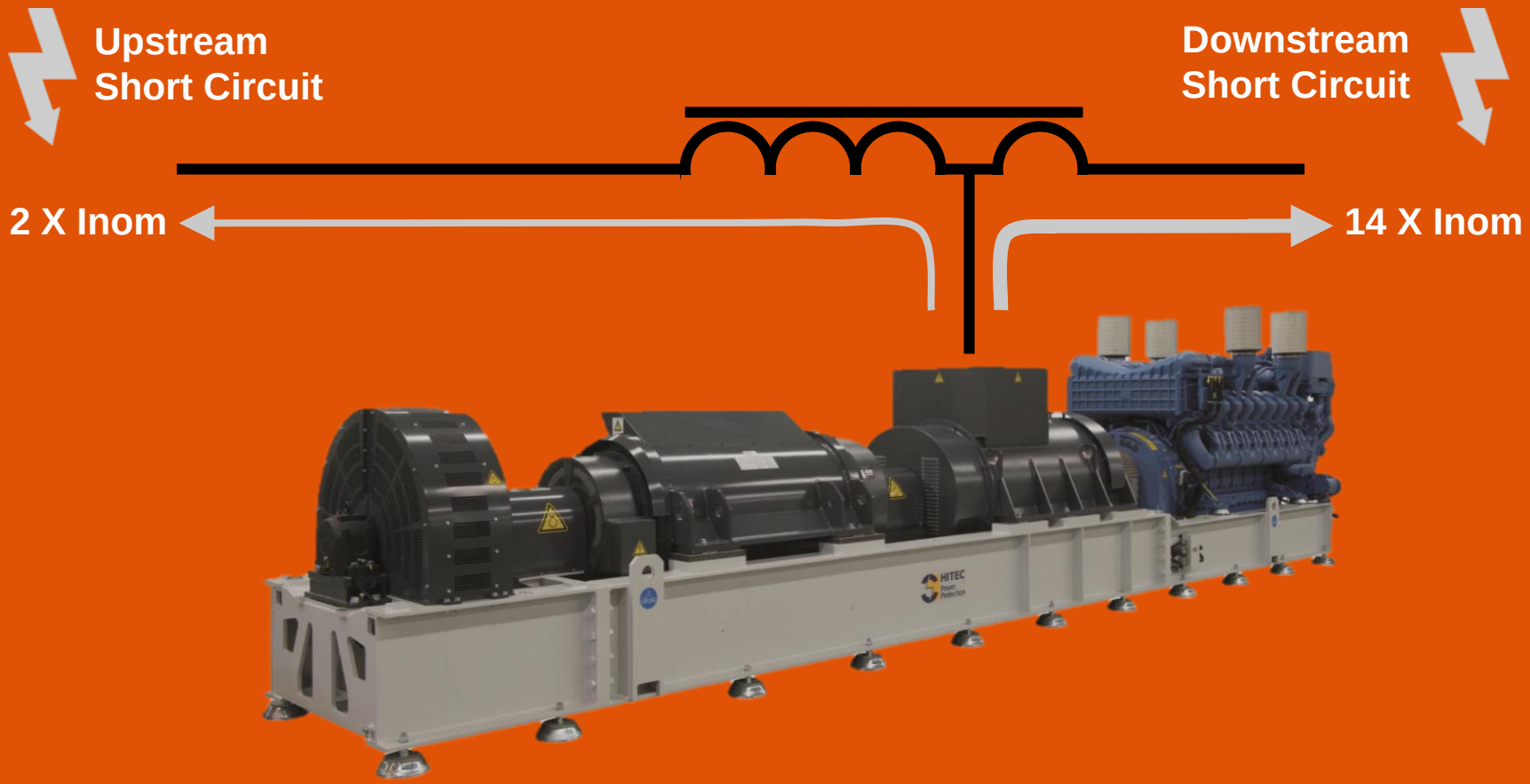
PFC

92%

Game Changing



Fault Clearing Capability



Benefits Dynamic UPS

Footprint

- Saves 40% in foot print

No batteries

- Unlimited number of cycles, fast recharge, no fire hazard, no toxic metals , no hydrogen

Efficiency

- No cooling for UPS or batteries required

Simplicity

- Less equipment, less distribution, less cables, easier to install, easier to manage

Lifetime

- Lasting 25-30 years with only 2 overhauls. Static UPS lasts 10-12 years, batteries even less.

Suitable for any load, LV or MV

- Allows also for mechanical (cooling) loads. Maximum flexibility.

High fault clearing capability

- Fast clearing: Minimizes the impact to other loads as a result of faults in the distribution

Benefits Summarized

TOTAL COST OF OWNERSHIP

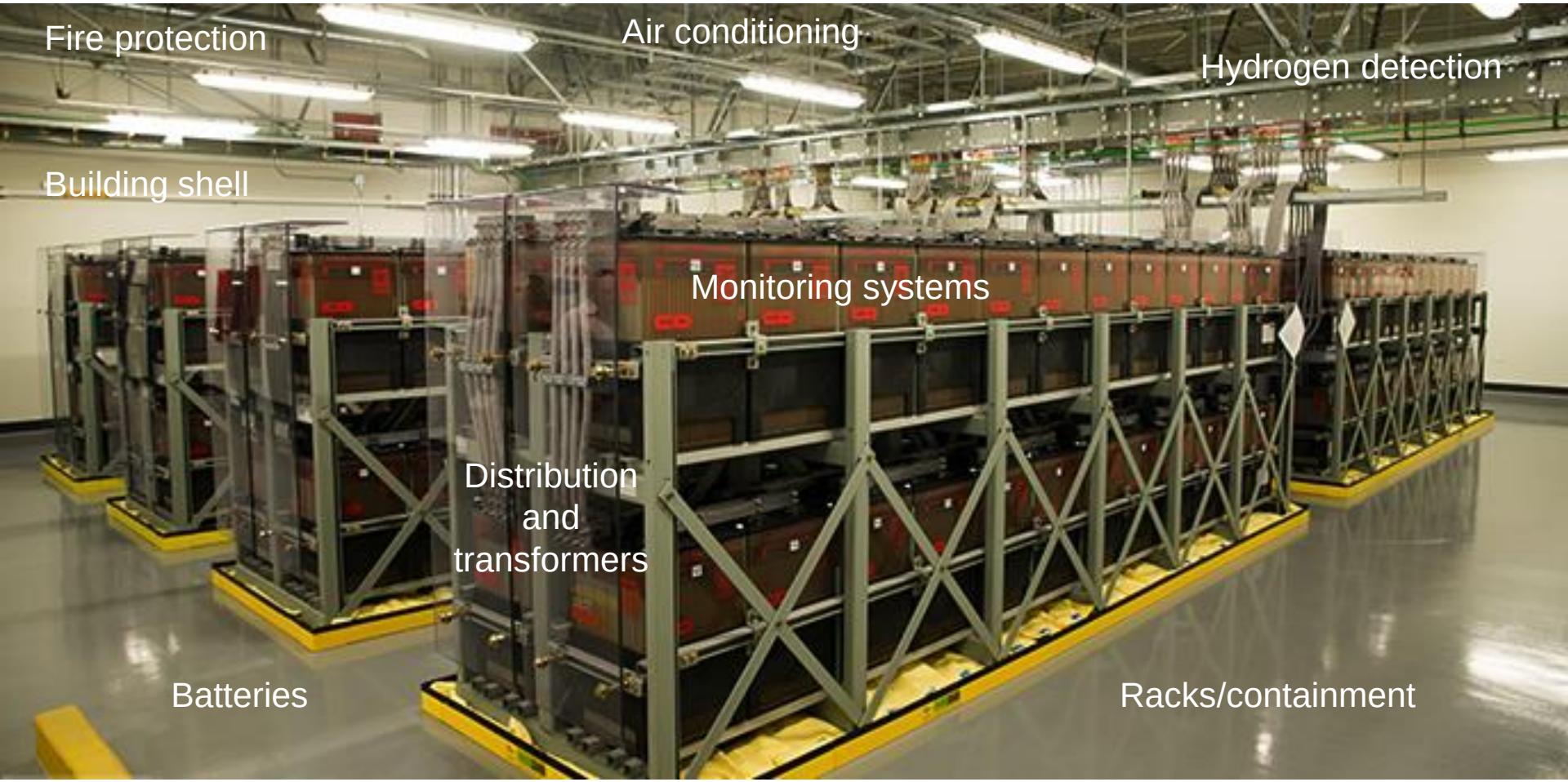
CAPEX – initial investment

A	Initial Asset Cost (one time)
A.1	Planning and programming
A.2	Acquisition
A.3	Design
A.4	Constructive / Site Development
A.5	Commissioning
B	Operations and Maintenance (recurring)
B.1	Lease or Rental
B.2	Maintenance
B.3	Operations
B.4	Overhead and Administration
C	Utilities (recurring)
C.1	Heat dissipation
C.2	Cooling
D	Renewal
D.1	Replacement
D.2	Overhauls
D.3	Upgrades
D.4	Improvements/Enhancements
E	End of Life
E.1	Sales / Adaptive Re-Use
E.2	Re-sale Value / Salvage Value
E.3	Removal
E.4	Site Restoration/Remediation
E.5	Deconstruction/Recycling

A.2	Acquisition
A.2.1	Static UPS systems
A.2.2	Switchgear (input/output)
A.2.3	Batteries / racks / cabinets
A.2.4	Battery monitoring
A.2.5	Hydrogen detection
A.2.6	Battery cabling and installation
A.2.7	Floor space
A.2.8	Fire suppression
A.2.9	HVAC system (UPS and battery room)
A.2.10	Thermal storage
A.2.11	Diesel Generator
A.2.12	Automatic Transfer Switch
A.2.13	Ventilation

A.2	Acquisition
A.2.1	DRUPS system
A.2.2	Ventilation

CAPEX


Fire protection
Air conditioning
Hydrogen detection
Building shell
Monitoring systems
Distribution
and
transformers
Batteries
Racks/containment

OPEX – running expenses (recurring)

A	Initial Asset Cost (one time)
A.1	Planning and programming
A.2	Acquisition
A.3	Design
A.4	Constructive / Site Development
A.5	Commissioning
B	Operations and Maintenance (recurring)
B.1	Lease or Rental
B.2	Maintenance
B.3	Operations
B.4	Overhead and Administration
C	Utilities (recurring)
C.1	Heat dissipation
C.2	Cooling
D	Renewal
D.1	Replacement
D.2	Overhauls
D.3	Upgrades
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E	End of Life
E.1	Sales / Adaptive Re-Use
E.2	Re-sale Value / Salvage Value
E.3	Removal
E.4	Site Restoration/Remediation
E.5	Deconstruction/Recycling

C	Utilities (recurring)
C.1	UPS heat dissipation
C.2	Cooling capacity UPS room
C.3	Cooling capacity Battery room
C.4	Ventilation

D	Renewal
D.1.1	Replacement of Capacitor
D.1.2	Replacement of Cooling Fans
D.1.3	Replacement of Batteries
D.1.4	Replacement of UPS
D.1.5	Overhaul Induction coupling

MODELS AND SIZES

Product Range

*Power*PRO series

Power range 470 – 3600 kVA

DYNAMIC UPS SYSTEMS

The HITEC PowerPRO series has the greatest reliability and uptime and the reduced energy consumption makes it the most efficient Dynamic UPS solution available in today's market. PowerPRO's innovative battery-free design increases reliability, saves space and minimizes environmental impact.

*Power*KEM series

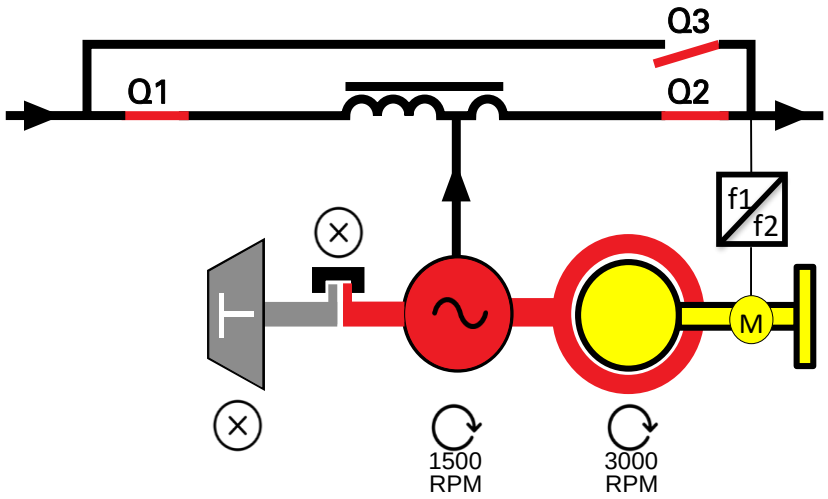
Power range 400 – 1000 kVA

DYNAMIC KEM SYSTEMS

The PowerKEM has been designed to be the central component of the power system of any facility that requires power protection and improved power quality. The PowerKEM series reinforces HITEC's range to provide a simple UPS system that can be configured to provide the desired level of redundancy and resiliency for your facility.

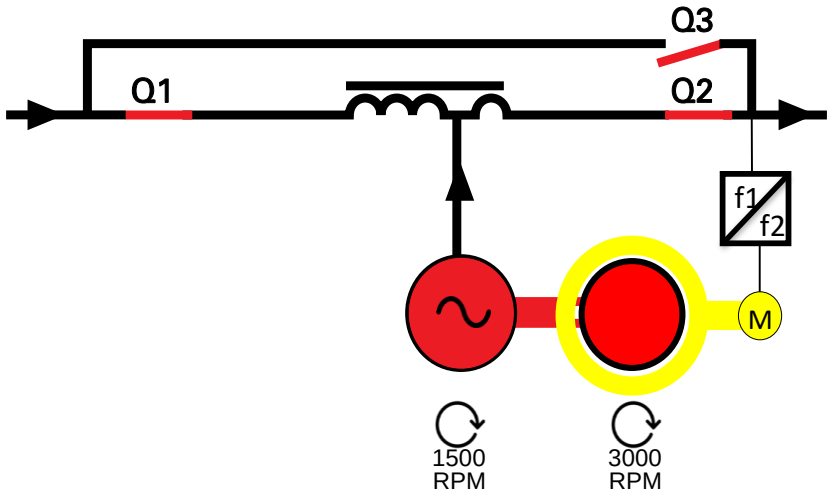
PowerPRO

DRUPS



PowerKEM

RUPS

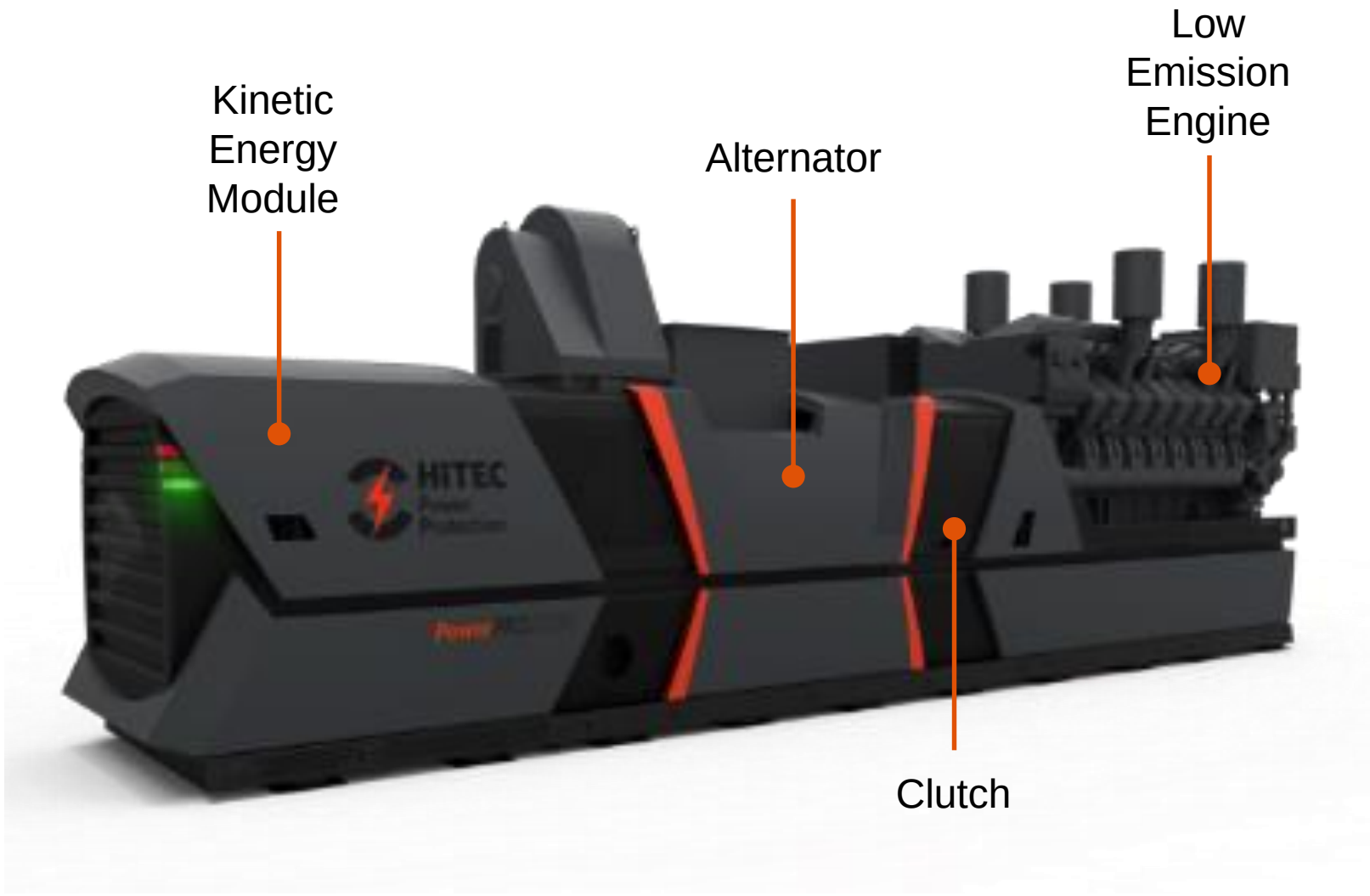


Product Range

Model	Range 50Hz	Product	Length	Mass
PowerPRO 1000	470-1000 kVA		6.4 m	7.7 t
PowerPRO 1800	1250-1700 kVA		7.8 m	14.7 t
PowerPRO 2700	1600-2230 kVA		8.7 m	26.5 t
PowerPRO 3600	2500-3000 kVA		11.8 m	41.5 t
PowerKEM	400-2000 kVA		2.9 m	8.0 t

Power*Pro 2700*: state of the art

Power Module Components

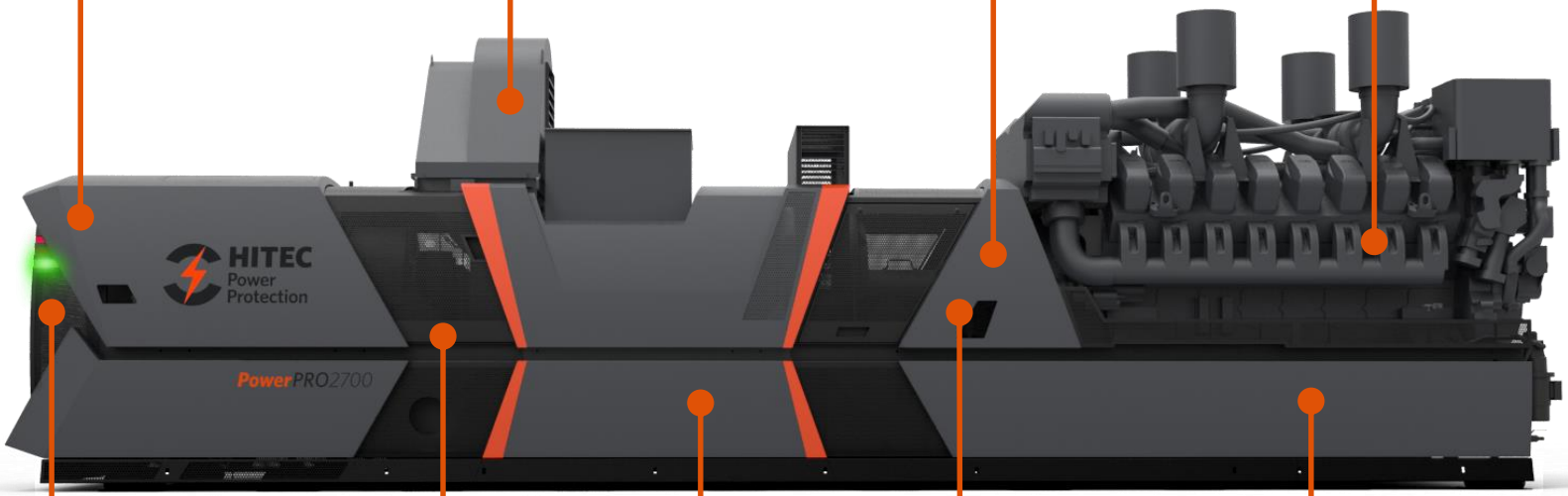


Integrated air filtration & ducted cooling

High efficiency cooling

Sound attenuated covers

Low emission engine



Health indicator

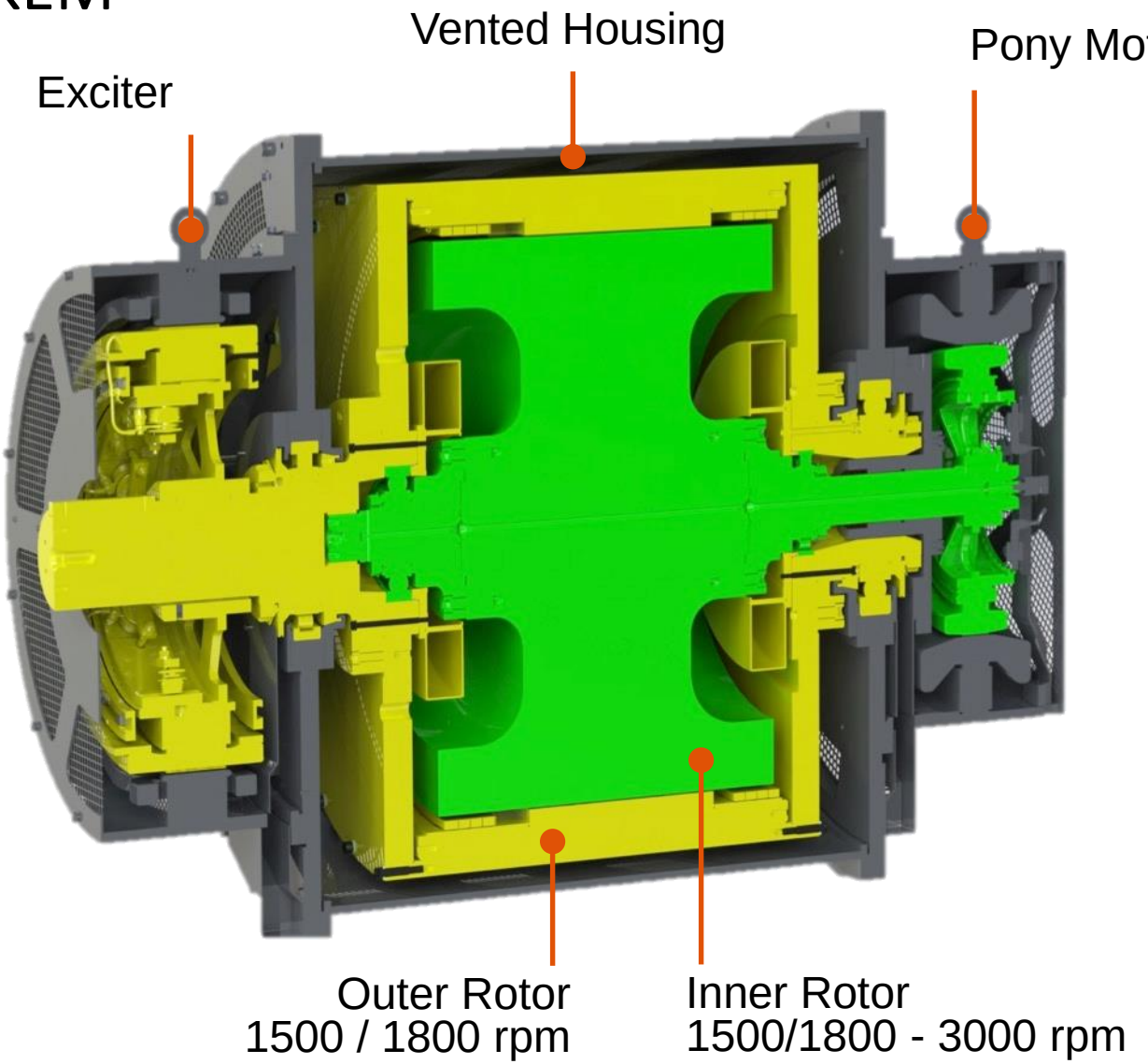
Accessible measuring points

Sliding covers

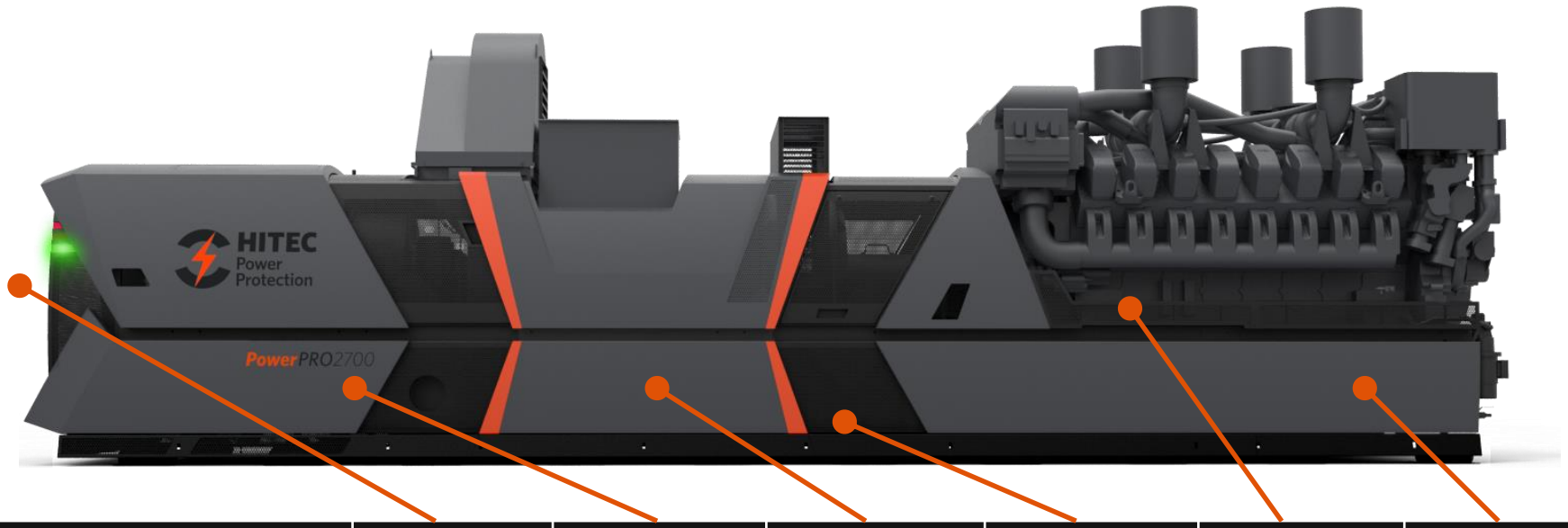
Automatic bearing lubrication

Service access

The ETM/KEM


Exciter
Vented Housing
Pony Motor
Outer Rotor
1500 / 1800 rpm
Inner Rotor
1500/1800 - 3000 rpm

Power*Pro 2700*: state of the art



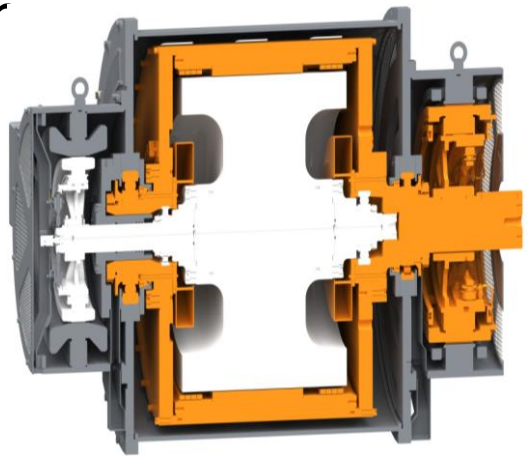
PowerPRO2700	Air inlet	Kinetic energy module	Generator	Freewheel clutch	Diesel engine	Base frame
Vibration monitoring	NA	Standard	Standard	NA	NA	Standard
Condition monitoring	NA	Standard	Standard	NA	NA	NA
Temperature monitoring	Standard	Standard	Standard	Standard	Standard	NA
Automatic bearing lubrication	NA	Standard	Standard	Standard	Standard	NA
Oil suppletion facility	NA	NA	NA	NA	Optional	NA

Kinetic Energy Module

‘’Automatic bearing lubrication”

- Lubrication of KEM and generator bearings
- Daily lubrication of all 6 bearings
- 2 grease reservoirs of each 2 Liters
- Refill grease reservoir 1x per year
- Grease level and flow detection
- Control & feedback to monitoring system

“Standard on PowerPRO2700 range”

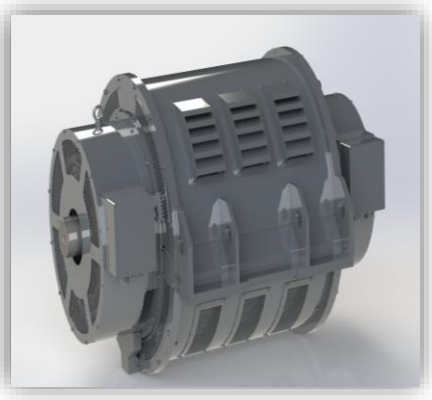


Kinetic Energy Module

‘’Automatic bearing lubrication”

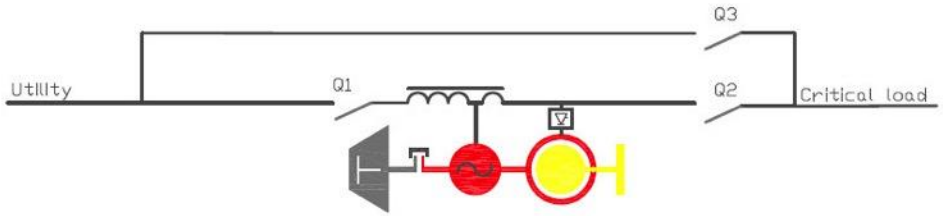
- Continuous and controlled lubrication while running (No STOP)
- Refill of grease reservoirs 1x per year while running (No STOP)
- Recommended overhaul time once every 10 years
- Calculated bearing lifetime of 10 years

“Low service requirements = Low TCO”

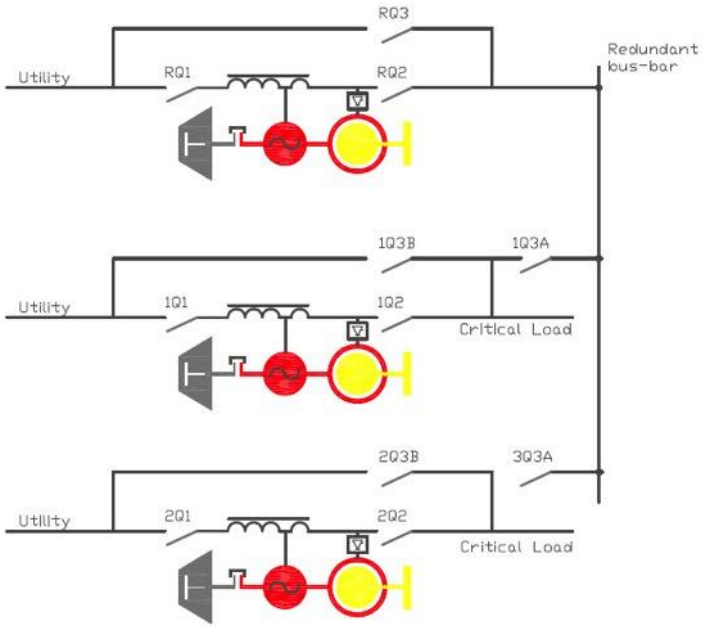


CONFIGURATIONS

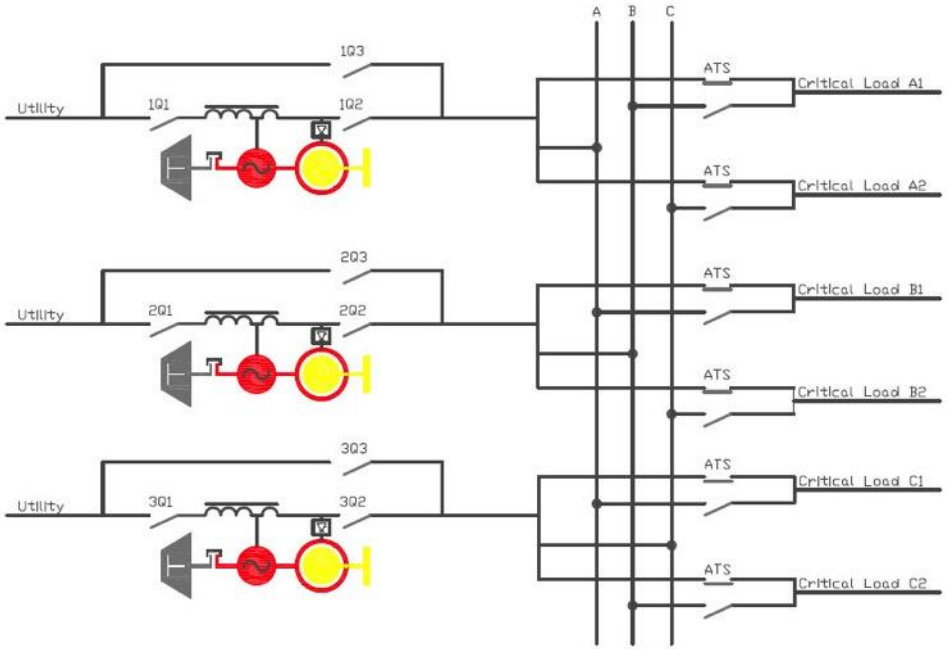
Single Systems



Single System

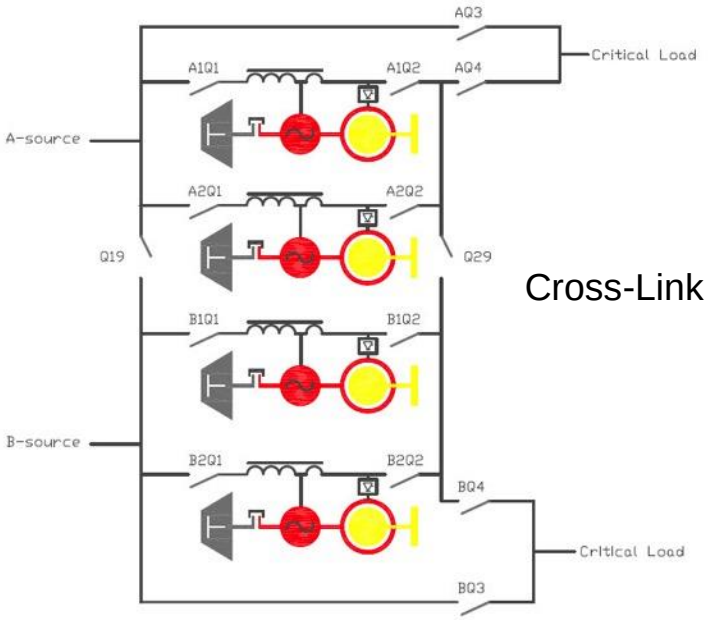


Isolated Redundant

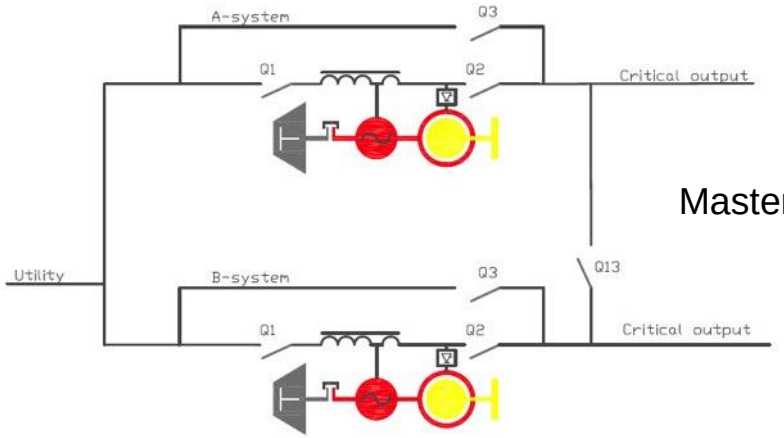


Distributed Redundant

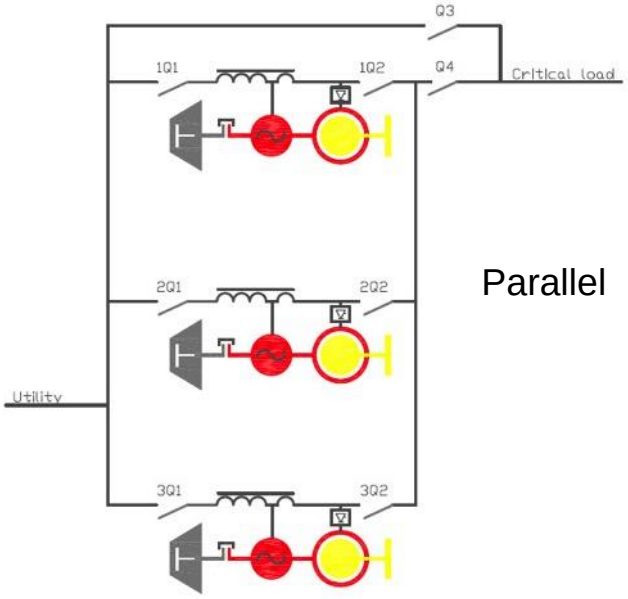
Parallel Systems



Cross-Link

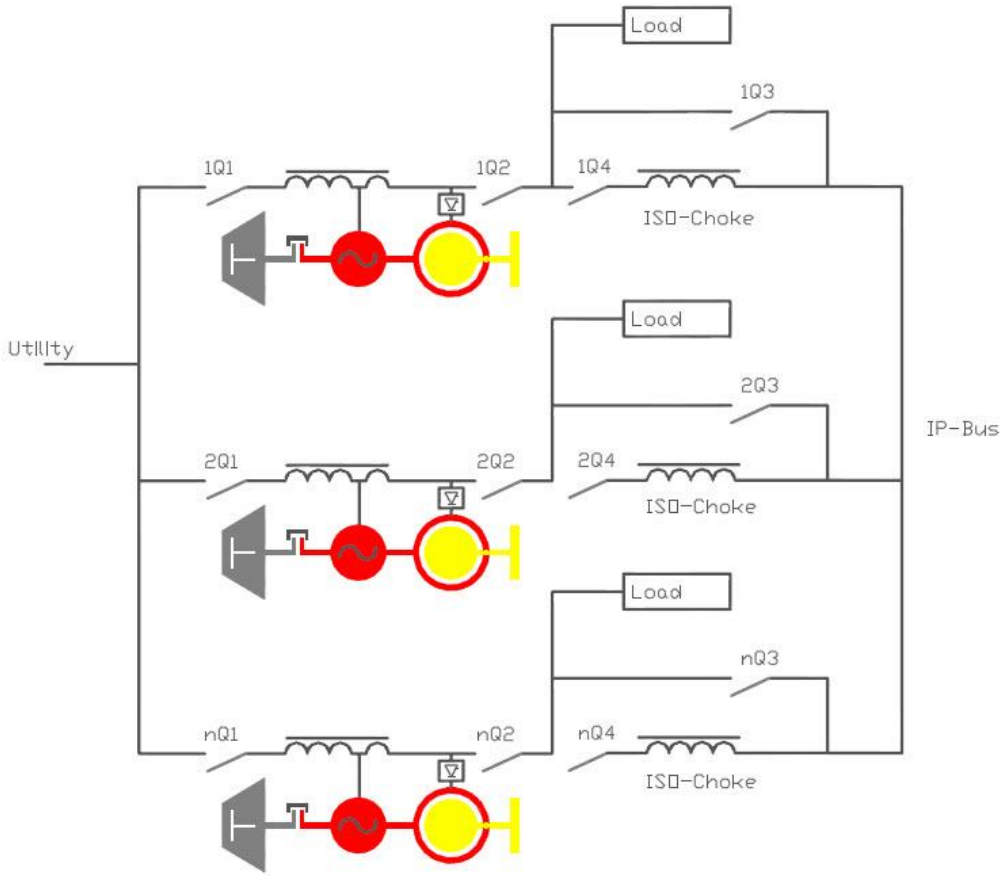


Master Slave



Parallel

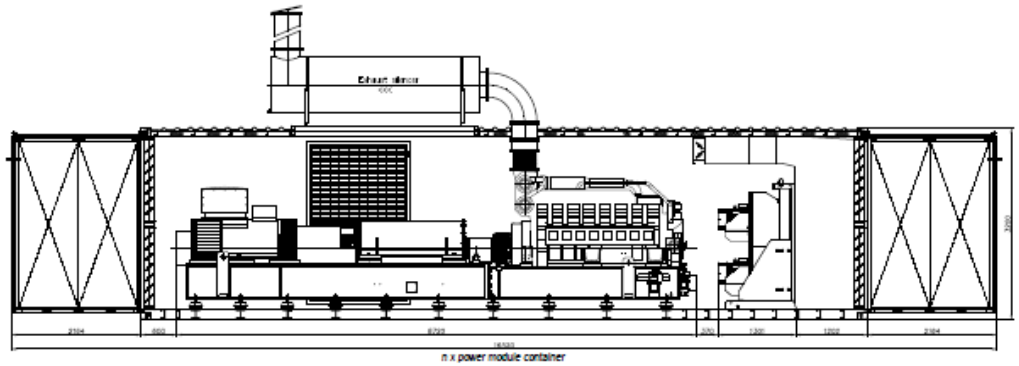
Everything In Between



Isolated Parallel

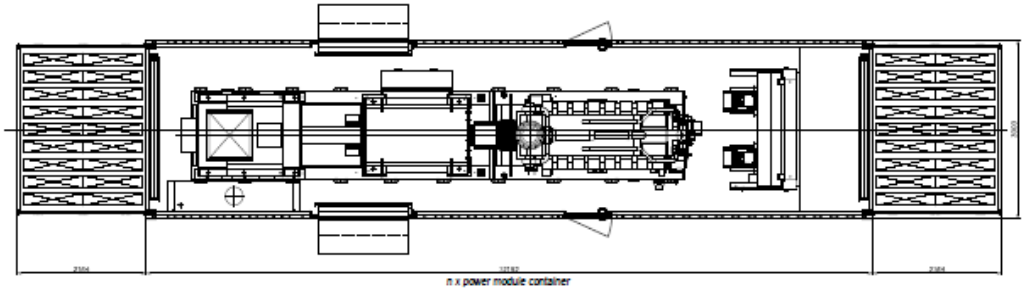
Turnkey Solutions

Containerized Solutions for any environment

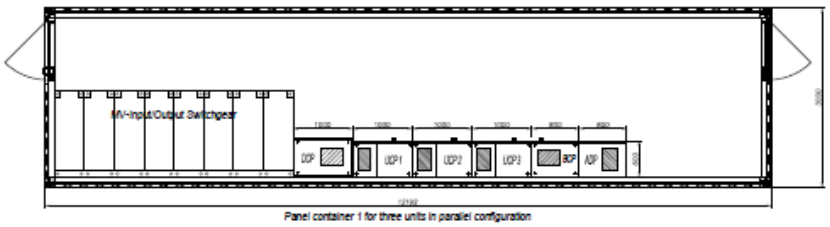


Ambient : 50 ℃

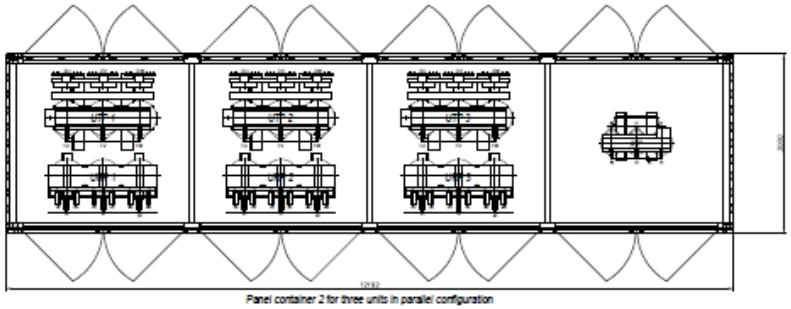
Air inlet



Air outlet



Switchgear and control panels



Transformers (MV/LV)

INSTALLED BASE EXAMPLES

IBM Cogeco

First 3600kVA site in North America

4160V alternators

Distributed redundancy

Up to 5,760kW of N+1 power

490 ft^2 footprint

Intel

Wafer fabrication

Medium voltage

Temp, pressure, humidity, filtration

Micro treatment plant

8 x 1600 kVA

DuPont Fabros

Turnkey & in-building options

Isolated/distributed redundant hybrid

22 x 2000kW units

6000 gallon base tanks

480 Volts

Morgan Stanley

Retrofit units,
3 x 2250 kW

Distributed redundant

Integrated with Siemens gear

Ni-Cad diesel starting

480 Volts

Nampak South Africa

Glass Manufacturing

10 x 2000 kVA

Parallel Configuration

Ni-Cad diesel starting

11kV / 50Hz

Data Center in Singapore

Colocation facility

5 x 2000kVA

Parallel Configuration

PowerPRO 2700

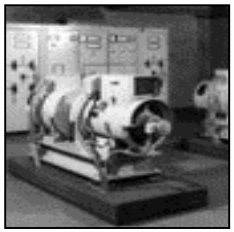
Hitec, the Company

First & best for 60 years

1896

The company begins life as HEEMAF, a Dutch electrical appliance manufacturer

HEEMAF creates the first rotary uninterruptible power supply.

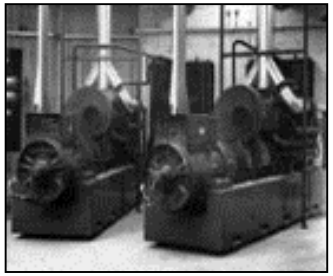


1956

1963

HEEMAF becomes Holec Holdings.

Holec unites a diesel generator with a rotary UPS, creating the first DRUPS unit in the world.

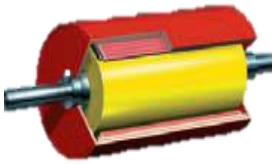


1969

Holec introduces the largest diesel rotary unit seen in the market to date: a 500 kVA DRUPS

1974

Holec develops the first independently rotating inner and outer bearing, the principal design for the next generation of equipment.



1991

HOLEC changes its name to:

HITEC Power Protection

1998

HITEC breaks the 3,000 kVA capacity mark with its VQZ.

2006

A flywheel is added and the ETM reengineered for the 60hZ US market.

Capacity for the flagship QPS unit now sits at a record 3,600 kVA.

2009

HITEC celebrates the 40th anniversary of the creation of the DRUPS unit

2013

HITEC Power Protection

HITEC rebrands and launches the first cladded DRUPS unit in production

2015

Global Reach

280 units

525 MVA

1050 units

1,270 MVA

520 units

840 MVA

Test facility at Almelo, The Netherlands




Google

msn

COGECO

DIGITAL REALTY

at&t

HEJIAN

PSC

intel

GLOBAL FOUNDRIES

SAMSUNG

UMC

P&G

Genentech

Pfizer

GE Healthcare

Bristol-Myers Squibb

Alcon




citibank

SIEMENS

Santander

Morgan Stanley

HITEC
Power
Protection

CONTINUOUS POWER
IN YOUR CONTROL

Thank you for your time.