rehlko

REHLKO *MF* Series

Modular high power three-phase uninterruptible power supply

(250 – 6000 kVA/KW MF DPA Series)
(1500 – 4500 kVA/KW MF DPA-CSB Series)

The REHLKO *MF* Series

Flexible *power*, efficient energy.

Exceptionally resilient, flexible and scalable high power modular UPS offering top-of-market VFI mode energy efficiency.

Available in distributed or centralised static bypass (CSB) configurations.

Redefined lifetime cost for data centres and other high density applications without compromising reliability.

REHLKO MF Series

- Online double conversion UPS
- DPA 250 kW to 1500 kW – parallelable to 6000 kW
- DPA-CSB 1500 – 2000 kW – parallelable to 4500 kW
- Slide-in vertical modules
- Cable free internal connections
- Single feed and dual feed options
- Market leading 97.4% efficiency

Footprint savings of

45%

VFI system efficiency in 250-2000 kW frames of up to

97.4%

Plug-in design makes it easy and safe to hot swap for

Continuous uptime

through concurrently maintainable power modules

REHLKO ***MF*** Series frame formats

0.75 MW
RHS and LHS connections available

1.0 MW
RHS and LHS connections available

1.5 MW

1.5 MW (DPA-CSB)

2.0 MW (DPA-CSB)

Engineered. Inspired. Informed.

- Designed for ease of use from the first moment of installation, module cabinets are easily transported to the UPS and slide into place on integrated wheels
- To make them easy, safe and error free, wired connections are entirely eliminated by use of slide-in modules and innovative, pre-engineered power and distribution frames
- Advanced design maximises life of consumables, eg fans and capacitors, with replacement only once in a 15-year period
- Recognising pressure on space, intelligent physical design delivers a power density of up to 493 kW/m2, some 45% better than traditional approaches, without compromising access
- An advanced visual interface and display allows an operator to observe performance, events and alarms onscreen, including battery voltage, UPS output and critical component status
- Comprehensive control and monitoring keeps operators and service teams fully informed. Information can be accessed remotely via SNMP, Modbus TCP/IP or Modbus RS-485 and integrated with associated systems, e.g. BMS, DCIM or EPMS

Additional control and monitoring features include:

- I/O dry ports
- Remote shutdown
- Castell interlock function
- Battery temperature input

plus compatibility with Rehlko's PowerNSURE battery management and PowerREPORTER 24/7 monitoring systems

N+1, fault-monitored fan assembly housed in cable-free slide-out drawer for maximum reliability and easy maintenance.

Innovation with purpose

Designed with a clear goal to define that reliability does not require excess, and high power can exist alongside efficient use of energy, the Rehlko MF Series modular UPS system combines proven DPA™ technology with the latest advances in components and software.

Innovative, vertical slide-in modules enable resilient, high power density protection by reducing UPS footprint up to 45% over traditional approaches, without compromising access for installation and maintenance.

That protection is achieved with top-of-market 97.4% VFI energy efficiency, reducing environmental impact, optimising PUE measures and delivering significant financial savings in energy and cooling costs.

PEP ecopassport

A 1.5MW Rehlko MF Series with a central connections cabinet flanked by six 250kW modules, each containing all elements of a UPS.

DPA™ – Resilient. Reliable. Flexible.

- Decentralised Parallel Architecture (DPA™) products contain all the essential components of a UPS within each module, including the static switch, allowing independent operation
- DPA™ modules can be hot-swapped without affecting the rest of the system, easing maintenance, reducing system repair times to minutes and dramatically increasing availability
- With 750kW, 1000 kW and 1500 kW standard DPA frame size options and 250 kW modules, systems can be sized for an initial load and scaled up or down depending on future requirements
- For flexibility and additional resilience, each DPA™ module can be fed from an independent or common battery system

Innovative vertical modules enable easy access whilst minimising physical footprint.

REHLKO ***MF*** DPA-CSB Series

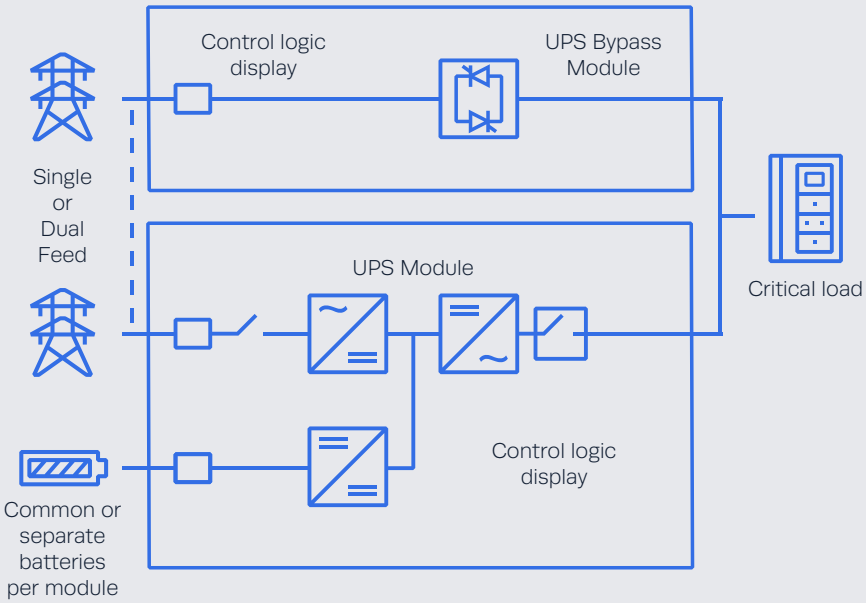
The Rehlko MF DPA-CSB Series is a dual feed double conversion online modular UPS with a centralised static bypass and innovative DPA.

- Centralised static bypass switch
- Each UPS module can operate autonomously
- Redundant critical components and paths serving the load; no single points of failure
- UPS modules can be online-swapped without impacting the load
- Redundant power configuration (N+1) with common or separate batteries
- Smart load sharing between the active UPS modules
- Continuous and redundant control and monitoring on module and system level

The innovative centralised static bypass (CSB) uses multiple thyristor blocks as a central static bypass, which is sized for the total combined UPS module capacity. The bypass switching devices use N+1 thyristors, which means the bypass itself has redundancy and the higher MTBF allows the UPS to function when one of the thyristors has failed. Equal current sharing between the thyristor elements is achieved using a unique, patented magnetic coupling system (externally certified).

The CSB features a higher I2t energy let-through capability.

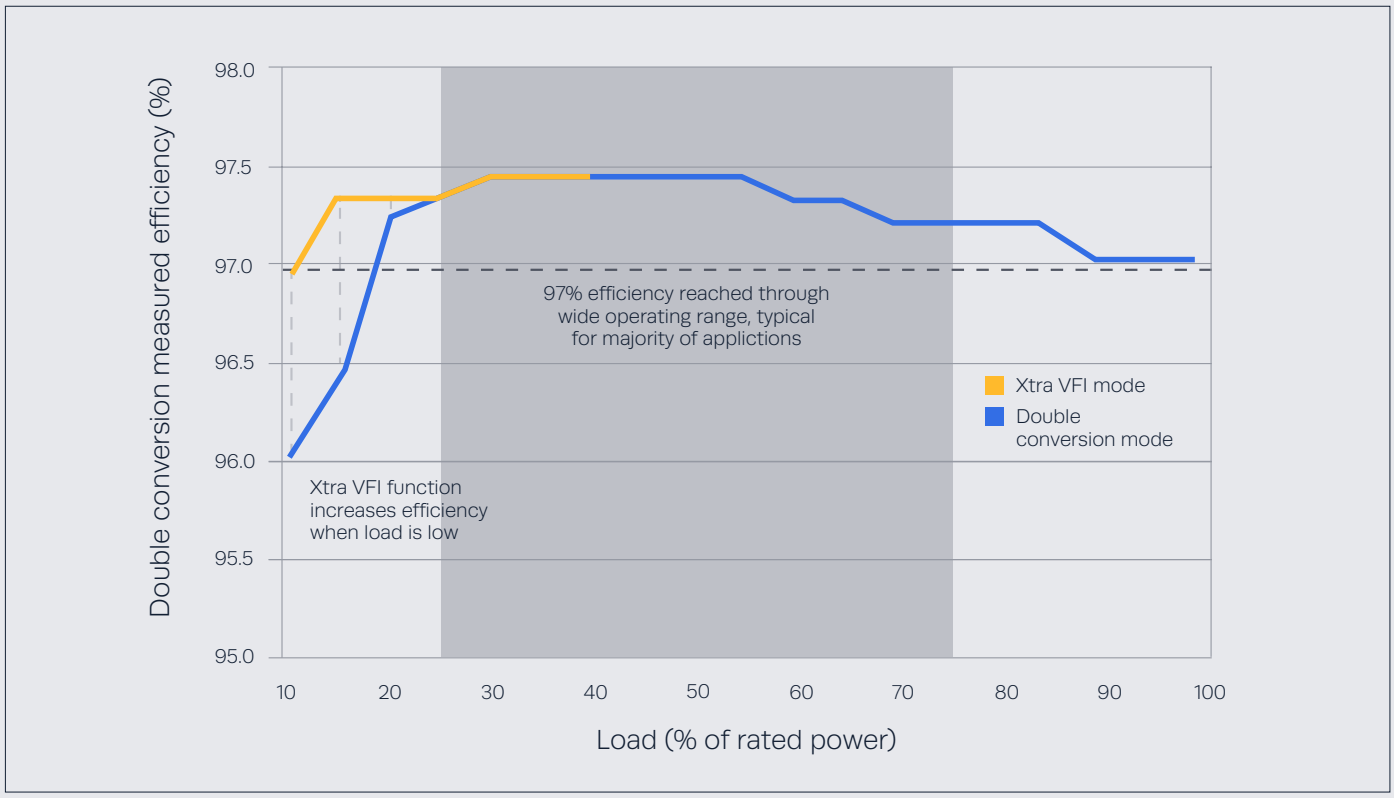
On the CSB variant, separate or common input feeds to the rectifier and static bypass can be implemented.



A 2.0MW DPA-CSB MF Series with a central connections cabinet and CBS module, flanked by eight 250kW DPA modules.

Effective efficiency

- Advanced components enable the Rehlko MF Series to deliver class leading energy efficiency, up to 97.4% at system level in VFI mode (i.e. Voltage and Frequency Independent, the most commonly used and most protective mode)
- Plus, design focus to ensure efficiency can be effectively used, means 97.4% efficiency is not solely delivered in a narrow sweet-spot but across a wide, practical load band
- Effective use of energy efficiency is enhanced further by Xtra VFI mode functionality. Often when load falls below 25%, UPS efficiency rapidly deteriorates. By automatically adjusting the number of active modules according to load and redundancy requirements, and reverting unneeded modules to standby, Xtra VFI avoids this. Intelligent switching rotates active modules, equalising aging and extending service life



Xtra VFI mode maintains high efficiency even when load drops below 25%.

In a 1.5 MW installation, over 10 years the 0.7% extra efficiency of the Rehlko MF Series vs a competitor at 96.7% can save over £360k* in electrical and cooling costs.

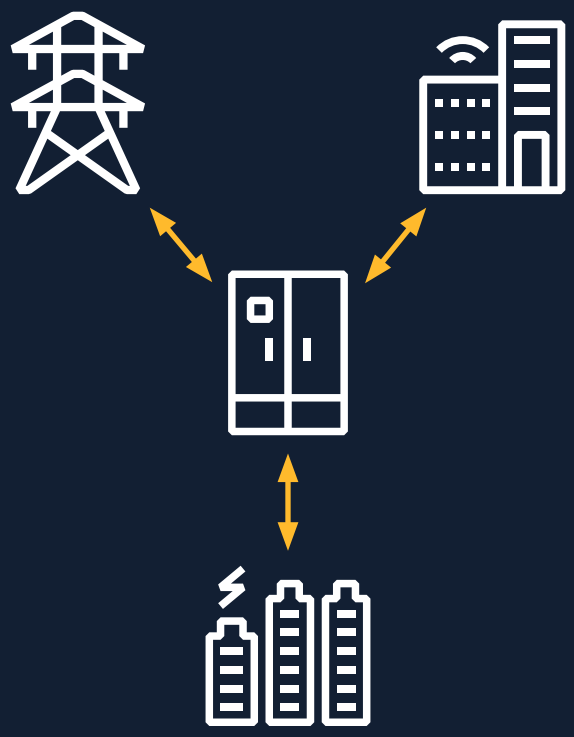
*£0.23 cost per kWH

Future-ready with Grid Support functionality

The MF Series is able to interact with the mains grid and external systems to provide:

- Input power reduction
- Input power increase
- Backfeed to grid

Supported functions include Fast Frequency Response and Island Mode operation. As system capabilities will also depend on local standards and battery selection, please consult Rehlko for more details.



Technical specification

General Data	MF 750DPA	MF 1000DPA	MF 1250 DPA	MF 1500DPA	MF 1500DPA-CSB	MF 2000DPA-CSB
System power range	250 kVA/kW to 6 MVA/MW (Max. power 250 kVA/kW per module)				1500 kVA/kW to 4.5 MVA/MW	
Max. modules per frame	3	4	5	6	6	8
Max. frames in parallel	6 (4.5 MW)	6 (6.0 MW)	4 (6.0MW)		3 (4.5MW)	2 (4MW)
Max power per frame	750, 1000 or 1500 kVA/kW				1500 kVA/kW	2000 kVA/kW
Topology	Double conversion, transformer-free, modular, centralised static bypass, DPA					
Cable entry	Bottom or top as standard					
Serviceability	Frontal access for power frame and connection frame, removeable power module with 360° access					
Back-feed protection	Built-in as standard					
Input						
Nominal input voltage	380, 400 or 415 VAC (Phase to Phase), 220, 230 or 240 VAC (Phase to Neutral)					
Voltage tolerance (at 40°C)	At 400V, Load ≤100%: -10%, +15% Load ≤60%: -30%, +15%					
Input distortion THDi	<3% at 100% linear load					
Frequency range	40Hz or 70Hz*(nominal Frequency +_10Hz)					
Power factor	0.99 at 100% load					
Walk in/Soft start	Yes					
Output						
Output power factor	1.0					
Rated output voltage	380, 400 or 415 VAC (Phase to Phase), 220, 230 or 240 VAC (Phase to Neutral)					
Output voltage variation	+/- 2% or 4% selectable (Synchronised with mains, allowing for transfer to static bypass)					
Voltage distortion THDv	<2%					
Frequency	50 or 60 Hz (selectable)					
Efficiency						
Overall efficiency	97.4% (VFI mode at 50% load)					
In eco-mode	Up to 99%					
Environment						
Protection rating	IP 20					
Storage temperature	-25°C to +55°C					
Operating temperature	0°C to +40°C					
Altitude (above sea level)	1000 m without de-rating					
Batteries						
Quantity of cells per string	Lithium ion: 136 cells / 17 modules max 6 frames of 17 modules per string VRLA 12V: 40-50 blocks/ 240-300 cells* NiCd: 400-500 cells					
Types	VRLA, NiCd, Lithium-Ion					
Battery charger	Decentralised charger per module					
Communications						
User interface	1 x decentralised graphical LCD touch screen, plus additional LCD display with navigation buttons and status LEDs per module					
Communication ports	USB, RS-232, voltage-free contacts, SNMP (optional)					
Customer interface	Remote shutdown, gen-set interface, external bypass contact					
Compliancy						
Safety	IEC / EN 62040-1					
EMC	IEC / EN 62040-2					
Performance	IEC / EN 62040-3					
Manufacturing	ISO 9001:2015, ISO 14001:2015, OHSAS 18001					
Weight/Dimensions						
Weight (with power modules)	1530 kg	1965 kg	2533 kg	3022 kg	3566 kg	4600 kg
Dimensions (mm) W x D x H	1830 x 1000 x 2000	2235 x 1000 x 2000	2645 x 1000 x 2000	3050 x 1000 x 2000	3645 x 1000 x 2000	4830 x 1000 x 2000

Note: For reference, in selected territories the Rehlko MF Series DPA is sold badged as the ABB MegaFlex DPA.

Exceptional 24/7/365
Service Support

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Rehlko is the new name for Kohler Uninterruptible Power

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