riello ups

DATACENTRE E-MEDICAL INDUSTRY TRANSPORT EMERGENCY

Master VDC

FLYWHEEL SOLUTIONS

3:3 100-600 kVA

VFI TYPE
ONLINE

Flywheel compatible

SmartGrid ready

Service 1st start

HIGHLIGHTS

CLEAN ENERGY

An eco-friendly, battery-free uninterruptible power system.

HIGH EFFICIENCY INNOVATIVE TECHNOLOGY

Modular expansion options for more power and runtime.

LONG OPERATING LIFE

20 year design life for the flywheel component compared with 7 years for a typical battery.

LOW MAINTENANCE COSTS

Easy to install and maintain.

Master VDC is a scaleable system comprised of one or more UPS units and VDC-XE/ VDC-XXE flywheels. Master VDC is ideal for modern ECO targeted data centres looking to achieve the lowest possible PUE ratios and highest levels of reliability.
Master VDC UPS provide a number of advantages over more traditional battery-equipped systems including: up to 99% efficiency, a compact footprint (up to 50% reduction), lower Total Cost of Ownership (TCO) and almost instantaneous recharge times. A single flywheel module provides sufficient runtime for the start-up of a local standby generator to power the UPS, which then provides a continuous quality power supply. The entire system can be scaled for reliable power (N+x) and increased runtime via the parallel operation of several UPS and/or flywheel modules (and a small battery pack if required, for additional reliability). In a standard configuration (1 x UPS and 1 x flywheel), the runtime available is more than sufficient to allow the UPS to ride through short breaks in mains power.

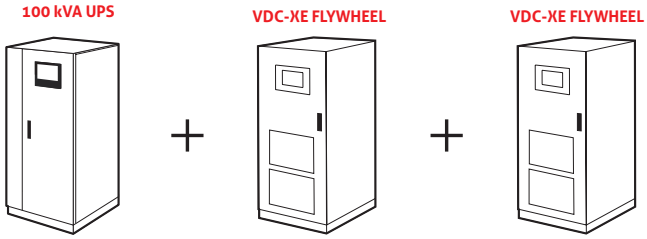
Flywheel VDC-XE/VDC-XXE

Thanks to their extremely high levels of reliability, the VDC series of flywheel energy storage systems provide UPS with a secure and reliable source of power that forms the first line of defence against interruptions to the mains power supply; a fundamental defence for all mission critical applications. The VDC flywheel systems are fully independent standalone devices. They are designed for applications such as data centres, hospitals and industrial installations. They provide a clean source of back up power by converting the kinetic energy stored within a rotating mass into electrical power using a built-in IGBT-based converter.
VDC series flywheels store kinetic energy in the form of a rotating mass (spinning at 36000 RPM) within a vacuum-sealed

MASTER VDC **CONFIGURATION EXAMPLES**

MODULARITY

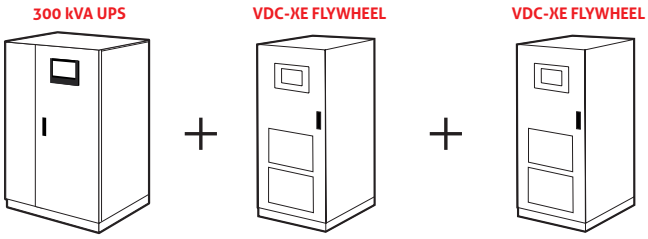
MHF 100



Autonomy:
example with load at 100%:

42 s, 1xVDC-XE
82 s, 2xVDC-XE

MHF 300

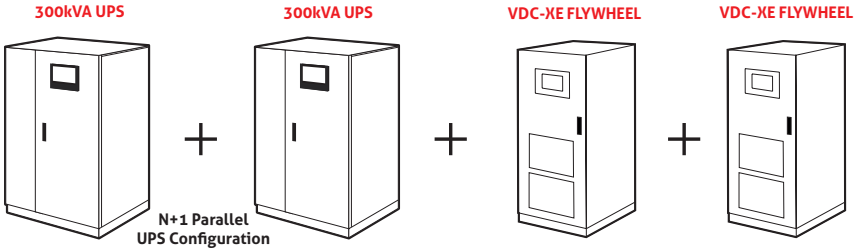


Autonomy:
example with load at 50%:

27 s, 1xVDC-XE
54 s, 2xVDC-XE

REDUNDANCY (PARALLEL CONFIGURATIONS N+1)

MHF 300P

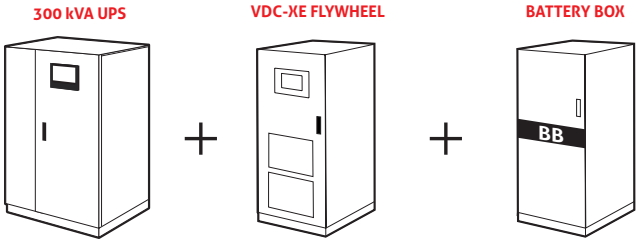


Autonomy:
example with load at 50%:

54 s, 2xVDC-XE
or 27 s, 1xVDC-XE

BATTERY HARDENING

MHF 300

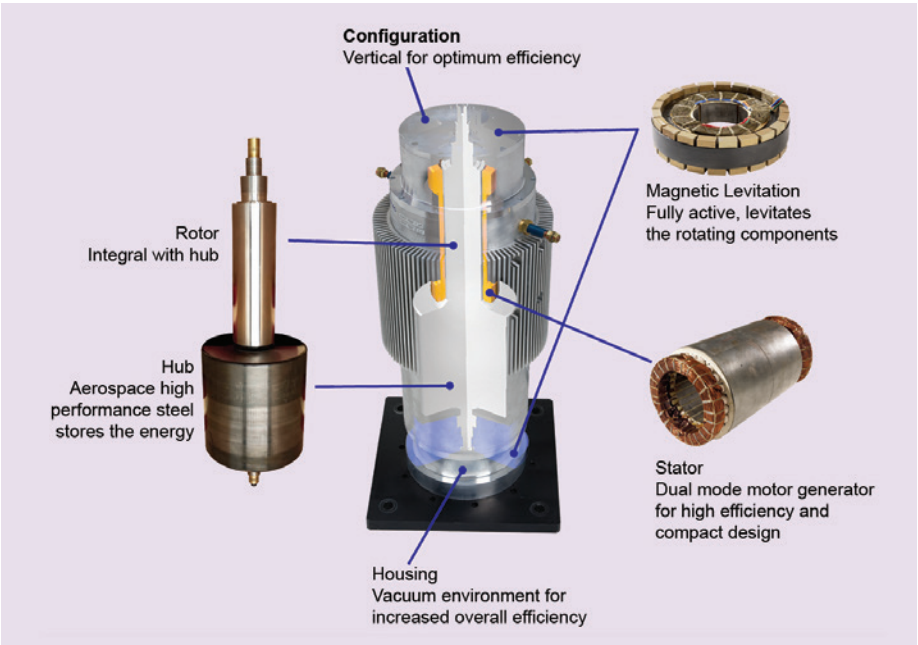


Autonomy:
example with load at 50%:

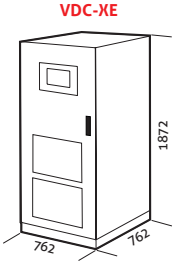
27 s, 1xVDC-XE

Plus 10 minutes from an additional battery set

container. The VDC build technology includes a rotor made from aerospace-grade steel, a high speed permanent magnet motor/generator and contact-free magnetic bearings that levitate and sustain the rotor during operation with no mechanical friction. These technical features allow VDC models to achieve very high levels of efficiency.



DIMENSIONS



MASTER VDC: **UPS MODULE SPECIFICATIONS**

MODELS	MHF 100	MHF 120	MHF 160	MHF 200	MHF 250	MHF 300	MHF 400	MHF 500	MHF 600
INPUT									
Nominal voltage	380 - 400 - 415 Vac three-phase								
Frequency	45 - 65 Hz								
Power factor	> 0.99								
Harmonic current distortion	<3% THDi								
Soft start	0 - 100% in 120'' (selectable)								
Frequency tolerance	± 2% (selectable from ± 1% to ± 5% from front panel)								
Standard equipment provided	Back Feed protection; separable bypass line								
BATTERIES									
Type	Flywheels								
Ripple current	Zero								
Recharge voltage compensation	-0.5 Vx°C								
OUTPUT									
Nominal power (kVA)	100	120	160	200	250	300	400	500	600
Active power (kW)	90	108	144	180	225	270	360	450	540
Number of phases	3 + N								
Nominal voltage	380 - 400 - 415 Vac three-phase + N								
Static stability	± 1%								
Dynamic stability	± 5% in 10 ms								
Voltage distortion	< 1% with linear load / < 3% with non-linear load								
Crest factor	3:1 lpeack/lrms								
Frequency stability on battery	0.05%								
Frequency	50 or 60 Hz (selectable)								
Overload	110% for 60 minutes; 125% for 10 minutes; 150% for 1 minute								
INFO FOR INSTALLATION									
Weight (kg)	656	700	800	910	1000	1400	1700	2100	2400
Dimensions (WxDxH) (mm)	800 x 850 x 1900		1000 x 850 x 1900			1500 x 1000 x 1900		2100 x 1000 x 1900	
Remote signals	dry contacts (configurable)								
Remote controls	ESD and bypass (configurable)								
Communications	Double RS232 + dry contacts + 2 slots for communications interface								
Ambient temperature	0°C / +40°C								
Relative humidity	<95% non-condensing								
Colour	Dark grey RAL 7016								
Noise level at 1 m	63 - 68 dBA					70 - 72 dBA		70 dBA	70 dBA
IP rating	IP20 (others on request)								
Smart Active efficiency	up to 98.5%								
Standards	Safety: EN 62040-1-1 (Directive 2014/35/EU); EMC: EN 62040-2 (Directive 2014/30/EU)								
Classification in accordance with IEC 62040-3	(Voltage Frequency Independent) VFI - SS - 111								
Moving the UPS	transpallet								

MASTER VDC: **FLYWHEEL MODULE SPECIFICATIONS**

MODEL	VDC-XE	VDC-XXE
POWER		
Maximum power	300 kW	
Max. energy storage	4000 kWs	6000 kWs
Flywheel rotation speed	from 36 750 to 24 500 rpm	from 36 750 to 14 000 rpm
INPUT		
Recharge voltage	400-600 Vdc	
Recharge current	15-50 A (adjustable)	
Efficiency	99.4%	
OUTPUT		
Discharge voltage	400-520 Vdc (adjustable)	
Voltage stability	+/- 1%	
Voltage ripple	≤ 2%	
INFO FOR INSTALLATION		
Ambient temperature	-10°C / +40°C	
Relative humidity	90% non-condensing	
Colour	Dark grey RAL 7016	
Noise level at 1 m	≤ 68 dBA	
Dimensions (WxDxH) [mm]	762 x 762 x 1872	
Weight [kg]	821	
IP rating	IP 20	
Standards	EMC EN 61000-6-4:2001; EMC EN 61000-6-2:2001; Safety EN 60204-1; Directives: 2014/35/EU; 2014/30/EU	

MASTER VDC: (FLYWHEEL ONLY) RUNTIME IN SECONDS

VDC-XE 300 kW		MHF 100	MHF 120	MHF 160	MHF 200	MHF 250	MHF 300	MHF 400	MHF 500	MHF 600
Number of FLYWHEELS	**POWER**	**100**	**120**	**160**	**200**	**250**	**300**	**400**	**500**	**600**
1	100%	40	33	22	15	9	5	-	-	-
2		79	65	49	39	30	24	14	8	-
3		118	98	73	58	46	38	28	20	14
4		156	129	97	77	61	51	38	30	23
5		195	162	121	97	77	60	48	38	31
Number of FLYWHEELS	**POWER**	**100**	**120**	**160**	**200**	**250**	**300**	**400**	**500**	**600**
1	75%	54	45	33	25	17	11	5	-	-
2		106	88	65	52	41	34	24	16	10
3		157	131	98	78	62	51	38	30	23
4		208	173	129	103	82	68	51	40	33
5		260	217	162	129	103	86	64	51	42
Number of FLYWHEELS	**POWER**	**100**	**120**	**160**	**200**	**250**	**300**	**400**	**500**	**600**
1	50%	82	68	51	40	32	25	11	5	4
2		159	132	99	79	63	52	39	30	23
3		237	197	147	118	94	78	58	46	38
4		313	260	195	156	124	103	77	61	51
5		391	326	244	195	156	129	97	77	64
Number of FLYWHEELS	**POWER**	**100**	**120**	**160**	**200**	**250**	**300**	**400**	**500**	**600**
1	25%	160	135	101	80	64	53	39	26	23
2		313	260	195	156	124	103	77	61	50
3		465	387	290	232	185	154	115	92	76
4		614	511	383	306	245	204	152	122	101
5		767	639	479	383	306	255	191	152	126

All runtimes refer to UPS with 0.9 pf and 94% efficiency for 100%, 75% and 50% load, and 92% efficiency for 25% load. With no battery connected.