UPS

Master VDC

Illustrative photo

Master VDC is a scaleable system comprised of one or more UPS units and VDC or VDC –XE 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 VD C and VD C-XE

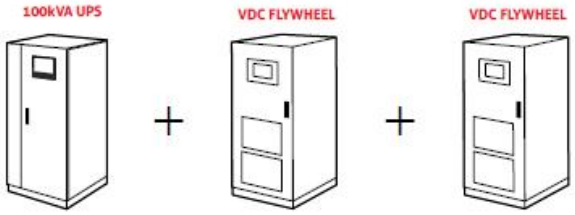
Thanks to their extremely high levels of reliability, the VDC series of flywheel energy storage systems provide UPS with a secure and reliable source of power that forms the first line of defence against interruptions to the mains power supply; a fundamental defence for all mission critical applications.
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 flywheel systems are available in two models, VDC standard and VDC -XE, which is able to provide superior performance for very short and very high power discharges.
VDC series flywheels store kinetic energy in the form of a rotating mass (spinning at 36,000 RPM) within a vacuum-sealed 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.

UPS

Master VDC

MODULARITY

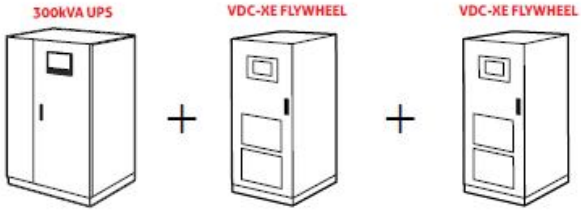
MHF 100



Autonomy:
example with load at 100%:

30s, 1xVDC
1m, 2xVDC

MHF 300



Autonomy:
example with load at 50%:

25s, 1xVDC-XE
52s, 2xVDC-XE

REDUNDANCY (PARALLEL CONFIGURATION N+1)

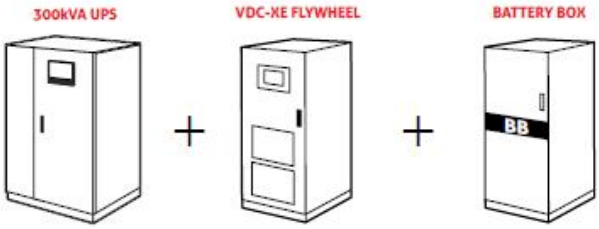
MHF 300P

Autonomy:
example with load at 50%:

52s, 2xVDC-XE
or 25s, 1xVDC-XE

BATTERY HARDENING

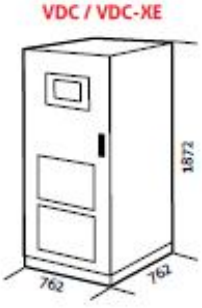
MHF 300

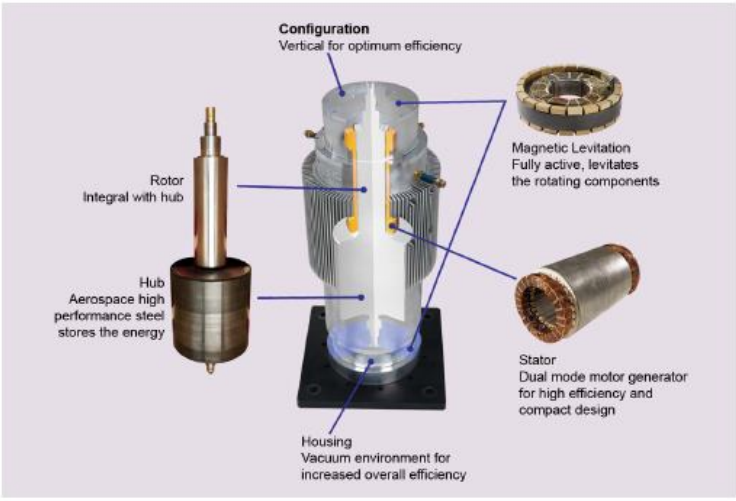


Autonomy:
example with load at 50%:

25s, 1xVDC-XE
Plus 10 minutes from an additional battery set

DIMENSIONS





Technical specification
MASTER VDC: UPS MODULE SPECIFICATION

Models	MHF 100	MHF 120	MHF 160	MHF 200	MHF 250	MHF 300	MHF 400	MHF 500	MHF 600
Input	**MHF 100**	**MHF 120**	**MHF 160**	**MHF 200**	**MHF 250**	**MHF 300**	**MHF 400**	**MHF 500**	**MHF 600**
Nominal voltage	380-400-415 V_{AC} 3-ph								
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	**MHF 100**	**MHF 120**	**MHF 160**	**MHF 200**	**MHF 250**	**MHF 300**	**MHF 400**	**MHF 500**	**MHF 600**
Type	Flywheels								
Ripple current	Zero								
Recharge voltage compensation	-0,5 Vx°C								
Output	**MHF 100**	**MHF 120**	**MHF 160**	**MHF 200**	**MHF 250**	**MHF 300**	**MHF 400**	**MHF 500**	**MHF 600**
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 V_{AC} 3-ph+N								
Static stability	± 1%								
Dynamic stability	± 5% in 10ms								
Voltage distortion	<1% with linear load / <3% with non-linear load								
Crest factor	3:1 Ipeack/Irms								
Frequency stability on battery	0,05%								
Frequency	50 or 60 Hz (selectable)								
Overload	110% for 60'; 125% for 10';150% for 1'								
Other features	**MHF 100**	**MHF 120**	**MHF 160**	**MHF 200**	**MHF 250**	**MHF 300**	**MHF 400**	**MHF 500**	**MHF 600**
Weight (kg)	656	700	800	910	1000	1400	1700	2100	2400
Dimensions (w x d x h) (mm)	800x850x1900		1000x850x1900			1500x 1000x1900		2100x 1000x1900	
Remote signals	Dry contacts (configurable)								
Remote control	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					70-72dBA		70dBA	70dBA
IP rating	IP20 (other on request)								
Smart Active efficiency	Up to 98,5%								
Standards	Safety IEC EN 62040-1-1 (Directive 2006/95/EC); EMC: EN 62040-2 (Directive 2004/108/EC)								
Classification in accordance with IEC 62040-3	(Voltage Frequency Independent) VFI-SS-111								

MASTER VDC: FLYWHEEL MODULE SPECIFICATION

Models	VDC	VDC-XE
Power	**VDC**	**VDC-XE**
Maximum power	215kW	300kW
Max. energy storage	3000kWsek @ 100kW	4000kWsek @ 100kW
Flywheel rotation speed	from 18500 to 36000 rpm	From 14500 to 36750 rpm
Input	**VDC**	**VDC-XE**
Recharge voltage	400-600 V_{DC}	
Recharge current	15-50A (selectable)	
Efficiency	99,2% at max. power	99,4% at max. power
Output	**VDC**	**VDC-XE**
Discharge voltage	400-520 V_{DC} (adjustable)	
Voltage stability	±1%	
Voltage ripple	≤2%	
Other features	**VDC**	**VDC-XE**
Ambient temperature	-20°C/+40ºC	
Relative humidity	95% non-condensing	
Colour	Dark grey RAL 7016	
Noise level at 1 m	≤68dBA	
Dimensions (w x d x h) (mm)	762x762x1872	
Weight (kg)	705	
IP rate	IP20	
Standards	EMC EN 61000-6-4:2001; EMC EN 61000-6-2:2001; Safety: EN 60204-1; Directive 2004/108/EC; 98/37/EC	

MASTER VDC: (FLYWHEEL ONLY) RUNTIME IN SECONDS

VDC 215kW		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%	30	22	13	7	-	-	-	-	-
2		60	50	37	29	20	14	7	-	-
3		89	74	55	44	35	29	18	11	6
4		118	98	73	58	46	39	29	19	13
5		147	123	92	73	58	48	36	29	20
Number of FLYWHEELS	**Power**	**100**	**120**	**160**	**200**	**250**	**300**	**400**	**500**	**600**
1	75%	41	34	22	15	9	-	-	-	-
2		80	66	50	39	31	24	14	8	-
3		119	99	74	59	47	39	29	20	14
4		157	131	98	78	62	52	39	31	23
5		197	164	123	98	78	65	48	39	32

VDC 215kW		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	50%	62	51	38	30	21	15	7	-	-
2		120	100	75	60	47	39	29	20	14
3		179	149	112	89	71	59	44	35	29
4		263	197	147	118	94	78	58	46	38
5		295	246	184	147	118	98	73	58	48
Number of FLYWHEELS	**Power**	**100**	**120**	**160**	**200**	**250**	**300**	**400**	**500**	**600**
1	25%	29	101	76	60	48	40	29	16	14
2		263	196	147	118	94	78	58	46	38
3		350	292	219	175	140	116	87	69	57
4		461	385	289	231	185	154	115	92	76
5		576	481	361	289	231	192	144	115	95

VDC-XE 300kW		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%	39	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 0.9pf and 94% efficiency for 100%, 75% and 50% load, and 92% efficiency for 25% load. With no battery connected.