



Master VDC

FLYWHEEL SOLUTIONS

3:3 100-600 kVA







Flywheel compatible

ONLINE



service

Service

1st start

SmartGrid ready

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 batteryequipped 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

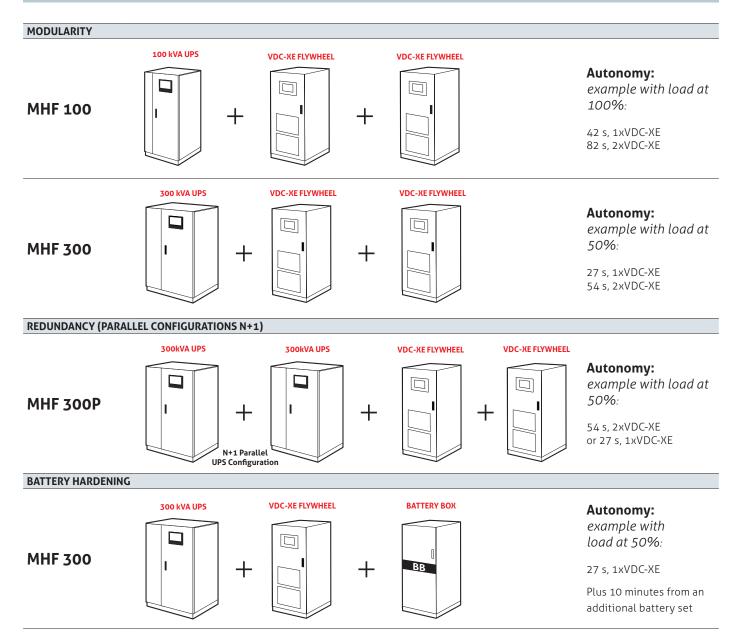
is more than sufficient to allow the UPS to ride through short breaks in mains power.

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



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.



Rotor

Integral with hub

Configuration

Vertical for optimum efficiency

Magnetic Levitation

Fully active, levitates

the rotating components

MASTER VDC: UPS MODULE SPECIFICATIONS

INPUT State State State Nominal voltage 380 - 400 - 415 Vac three-phase -	MODELS	MHF 100	MHF 120	MHF 160	MHF 200	MHF 250	MHF 300	MHF 400	MHF 500	MHF 600	
frequency 45 - 65 Hz Power factor > 0.99 Harmonic current distortion 39,87 HDi 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 7 Type Flywheels Recharge voltage compensation -0.5 Vx°C OUTPUT 700 Nominal power (IVA) 100 120 160 200 250 300 450 540 Number of phases 380 - 400 - 415 Vac three-phase + N 540 540 540 Number of phases 380 - 400 - 415 Vac three-phase + N 541 stability ± 1% 540 Voltage distortion < 1% with linear load / 53% with non-linear load											
Power factor > 0.99 Harmonic current distortion <3%6 THDi	Nominal voltage		380 - 400 - 415 Vac three-phase								
Harmonic current distortion <396 Th0i 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 2ero Recharge voltage compensation -0.5 Vx°C OUTPUT -0.5 Vx°C Nominal power (kVA) 100 120 160 220 250 300 400 500 600 Active power (kVA) 90 108 144 180 225 270 360 450 540 Numbar of phases 3 + N	Frequency										
Soft start 0 - 100% in 120" (selectable) Frequency tolerance ± 2% (selectable) from 1% to the 5% from from tone) BartTERIES Back Feed protection; separable bypass line Type Flywheels Recharge voltage compensation -0.5 Vx*C OUTPUT Total 1% to the 5% from from tone panel Nominal power (kW) 100 120 160 200 250 300 400 500 600 Active power (kW) 90 108 144 180 225 270 360 450 540 Nominal power (kW) 90 108 144 180 225 270 360 450 540 Number of phases 3 + N Nominal voltage 3 + N Static stability 1 + 1% Dynamic stability 1 + 1% Dynamic stability 1 + 1% Dynamic stability 1 + 2% 6% in 10 ms Frequency stability on battery -005% Frequency stability on battery -005% Static stability -005% -000 1000 1400 1 - 200 2400 2400 2100 × 1000	Power factor										
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Static stability $\pm 1\%$ Dynamic stability $\pm 1\%$ Watage distortionCrest factorFrequency stability on batteryFrequency stability on battery0.05%FrequencyOverload110% for 60 minutes; 125% for 10 minutes; 150% for 1 minuteINFO FOR INSTALLATIONWeight (kg)656700800 x 850 x 19001000 x 850 x 1900CommunicationsDouble RS232 + dry contacts (configurable)CommunicationsDouble RS232 + dry contacts + 2 slots for communications interfaceAmbient temperature0°C / +40°CRelative humidity<95% non-condensing	Number of phases	3 + N									
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Synthetic stress Synthetic stress Voltage distortion < 1% with linear load / < 3% with non-linear load	Static stability										
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CommunicationsDouble RS232 + dry contacts + 2 slots for communications interfaceAmbient temperature0°C / +40°CRelative humidity<95% non-condensing	Remote signals										
Ambient temperature0°C / +40°CRelative humidity<95% non-condensing	Remote controls				ESD and	bypass (conf	igurable)				
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Noise level at 1 m63 - 68 dBA70 - 72 dBA70 dBA70 dBAIP ratingIP20 (others on request)Smart Active efficiencyup to 98.5%StandardsSafety: 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	Relative humidity				<959	% non-conde	nsing				
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Classification in accordance with IEC 62040-3 (Voltage Frequency Independent) VFI - SS - 111	Smart Active efficiency										
IEC 62040-3 (Voltage Frequency Independent) VFI - 55 - 111	Standards	Safety: EN 62040-1-1 (Directive 2014/35/EU); EMC: EN 62040-2 (Directive 2014/30/EU)									
Moving the UPS transpallet		(Voltage Frequency Independent) VFI - SS - 111									
			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	400-60	0 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; Saf	ety EN 60204-1; Directives: 2014/35/EU; 2014/30/E						

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.



