

CHLORIDE

Secure Power Always

VDC and **VDC-XE**



Flywheel system

VDC and VDC-XE

The **VDC** and **VDC-XE Flywheel systems** are designed for high power, short discharge applications, providing a fast, predictable and seamless option for backup power. Offering durability and dependability, flywheels store kinetic energy in the form of a rotating mass and are capable of charging and discharging at high rates for countless cycles.

The employment of patented technology and the presence of a high speed motor/generator, an advanced control system and a five point magnetic levitation system, all combine to provide optimum efficiency and enhanced reliability.

Main features

- 300 kW of power provided by a single flywheel (see run time tables for power and run time combinations).
- Parallel flywheel cabinets providing higher power and longer autonomy or redundancy.
- Flywheels can be paralleled with batteries for added redundancy and increased battery life.
- Complete with DC disconnect breaker for easy isolation.
- Durable bearings, excluding the need for replacements.
- Extremely low maintenance.
- Simple and easy installation.
- Touch screen GUI providing:
 - Easy configuration
 - Full monitoring
 - Event logging.

Key User Benefits

- **Reliability** - Higher reliability than a single string of VRLA batteries which are typically used in UPS applications.
- **Predictable energy availability** - Built in monitoring and reporting systems ensure that both the available energy storage and the status of the flywheel are always known.
- **Longer life** - Vycon Flywheels have a 20 year design life. Flywheels have optimum discharge rates and the ability to perform thousands of discharges, with the last discharge run time being equal to the very first one. Furthermore, the performance of the flywheel does not degrade with time or use.

- **Reduced maintenance requirements** - Reduced maintenance thanks to the use of a magnetic levitation system rather than mechanical bearings that are found in older generation flywheels.
- **Footprint savings** - Optimum space savings thanks to the Vycon Flywheel's high power density which frees from 50 to 75% of the space that would have been used by an equivalent power rated battery bank.
- **Temperature controlled environment not necessary** - Ability to operate in temperatures from 0°C to 40°C, allowing installation in more cost effective spaces such as electrical equipment rooms.
- **Environmental respect** - Vycon Flywheels do not contain any toxic materials.

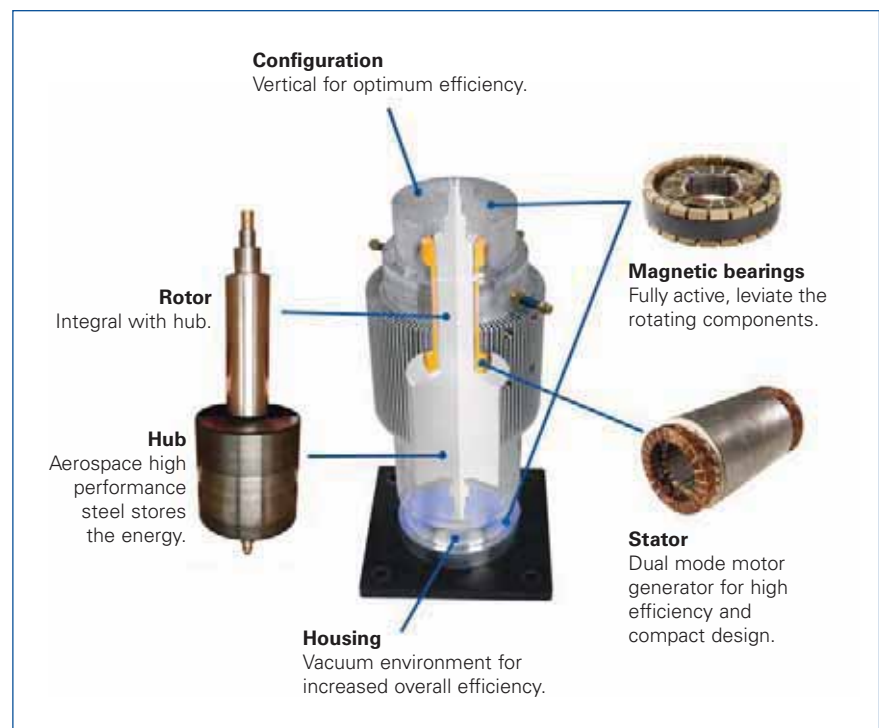


Figure 1 - Internal structure of the rotating mass.

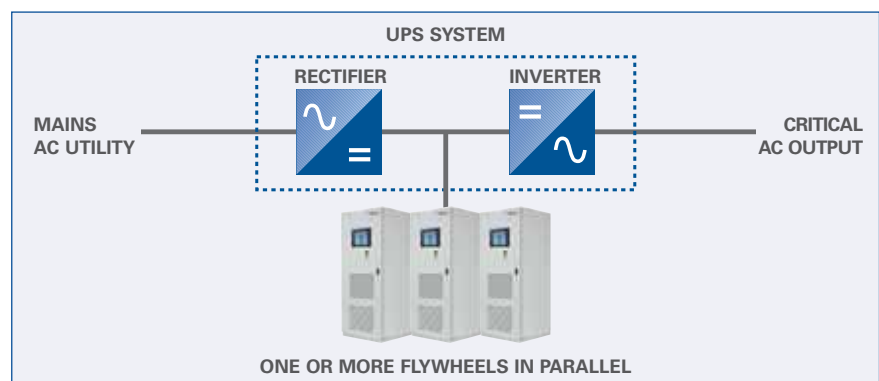


The **VDC** and **VDC-XE Flywheels** are fully compatible with Chloride three-phase UPS. By monitoring the UPS DC bus, the system reacts to changes in the DC voltage levels. The two-way IGBT system allows both charging and discharging through the same channel. Flexible charging parameters can be set to meet customer requirements.

The flywheel is generally used for the following system configurations:

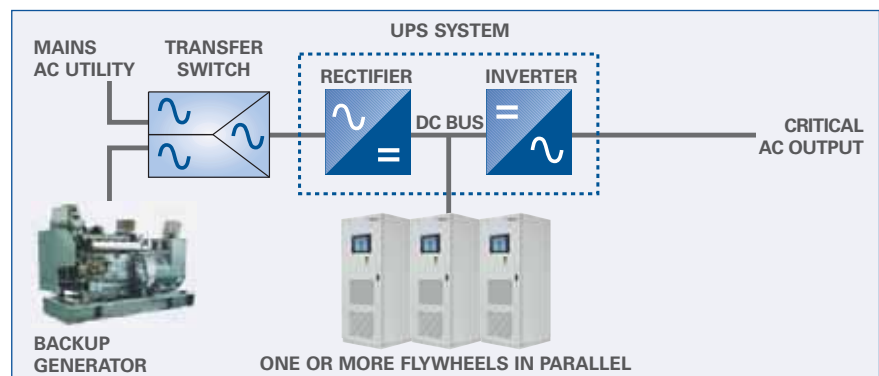
Short-duration ride-through

Flywheel systems are particularly suited to manufacturing and process applications where short duration interruptions to the mains supply can cause loss of production and high maintenance following a power break. By simply using the flywheel's available energy (one or more in parallel connection), VDC and VDC-XE can be used together with the UPS to provide protection against short-duration "glitches" or outages.



Ride-through "Bridge" to generator

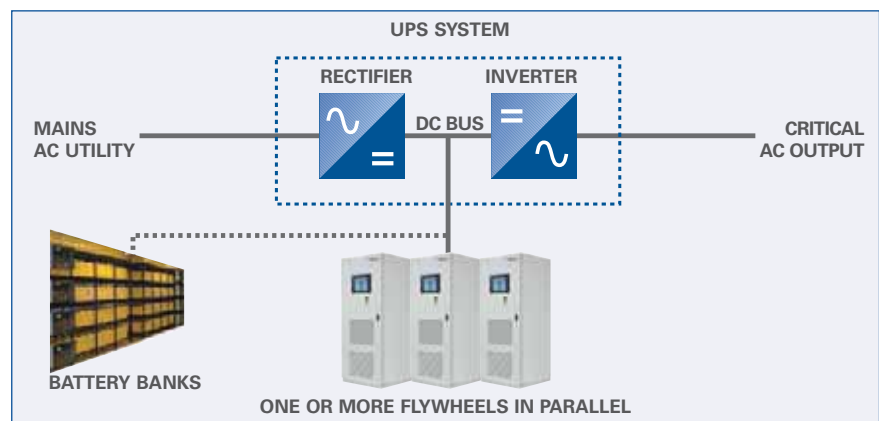
In applications where there is already a standby generator Vycon Flywheels (in single or parallel configurations) can provide the necessary power bridge to cover the transition to standby generator. Often in these circumstances, the time required to start the generator and for it to take over supply to the load is less than 15 seconds.



Battery "hardening" and life extension

As a result of the flywheel's programmable DC voltage, they can be easily paralleled with a battery bank, providing:

- Redundant energy storage on the UPS DC bus
- A programmable first line of "defense" against outages
- Un-cycled batteries (unless the flywheel system has exhausted its energy)
- Preserved battery capacity for longer timescales
- Extended battery life expectancy
- Enhanced UPS reliability.





Compatibility with Chloride UPS

VDC and VDC-XE are compatible with Chloride three-phase UPS including the 80-NET and 90-NET. The UPS can be connected with either single or multiple parallel flywheel units, and can also be paralleled with battery banks.



80-NET.
Available from 60 to 200 kVA



90-NET
Available from 250 to 800 kVA

Front panel touch screen

VDC and VDC-XE incorporate a user-friendly touch screen interface providing operational information. The control panel allows the starting and stopping of the unit and allows access to the system parameters. This access is view only and will not allow system changes to be made. A service access tool which enables operating settings to be adjusted during start up and commissioning is used by the Chloride trained engineer to carry out configuration changes if required.

The display's key parameters are:

- **System status.** The system status is easily understood by the color-coded indicator in the upper left corner of the touch screen.
- **System mode.** Displays the flywheel's current mode of operation (charging/charged/discharging).
- **Available energy (%).** Displays the VDC and VDC-XE's available energy.
- **Number of discharge events.** Highlights the total number of discharge events that have occurred, including both partial and full discharges.
- **System START/STOP.** This function allows the starting or stopping of the system.
- **Warning/Alarm event log.** Provides access to key information which is displayed in a table, indicating the warning and alarm events that have occurred.
- **Operating parameters.** Provides access to key product and system information and 10 fault monitoring parameters.
- **Audible alarm.** The VDC and VDC-XE include an audible alarm that sounds when a warning or anomaly occurs.

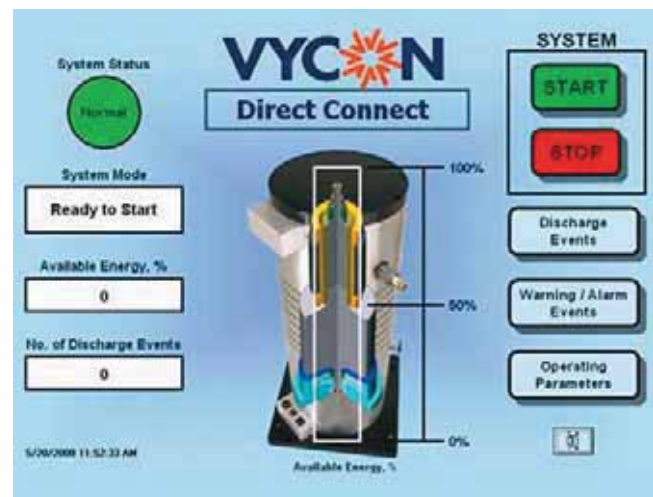


Figure 2 - Touch screen panel.

Run Times*

Number of Flywheels VDC	UPS Output Power Rating (kVA)											
	40	60	80	100	120	160	225	275	450	550	750	1100
1	99.8	670	50.3	40.3	33.6	21.9	11.7	6.4				
2				80.0	65.0	48.8	34.8	26.6	11.3	6.2		
3						72.3	51.5	42.2	23.2	16.8	8.5	
4								55.6	34.1	26.1	16.0	6.0
5										34.8	23.0	11.7

Number of Flywheels VDC-XE	UPS Output Power Rating (kVA)											
	40	60	80	100	120	160	225	275	450	550	750	1100
1	99.8	670	50.3	40.3	33.6	25.6	17.4	11.7				
2				80.0	65.0	48.8	34.8	28.6	16.8	11.4	6.1	
3						72.3	51.5	42.2	26.1	21.5	13.9	6.2
4								55.6	34.1	28.0	20.8	11.1
5										34.8	25.8	17.1

* Backup times are estimated using a 0.9 Output Power Factor, at a 80% Full Load Rating and 96% Inverter Efficiency. For different conditions please contact our Chloride experts.



OPERATING PARAMETERS	VDC	VDC-XE
POWER / DURATION RATINGS		
Maximum power	215 kW for 5 sec	300 kW for 5.4 sec
Maximum energy storage	3.000 kW-sec. @ 100 kW load 100 kW for 30 s	3.000 kW-sec. @ 160 kW load 160 kW for 18.8 s
Flywheel rotational speed (kRPM)	18.5 to 36	18.5 to 36
INPUT		
Input Voltage	400-600 VDC	400-600 VDC
Recharge rate (A)	15-50 (Adjustable per application ⁽¹⁾)	15-50 (Adjustable per application ⁽¹⁾)
Efficiency (%)	99.2 ⁽²⁾	99.4 ⁽²⁾
OUTPUT		
Voltage discharge (VDC)	400 - 520 (Adjustable per application)	
Voltage regulation (%)	+/- 1	
DC ripple (%)	< 2	
GENERAL		
Operating temperature (°C)	-20 to +40	
Humidity (%)	95% non condensing	
Altitude	1.500 m maximum max without de-rating	
Audible noise (dBA)	< 68 dBA at 1 m	
Degree of protection	IP 21	
STANDARDS		
Electromagnetic compatibility (EMC) Emission requirements for industrial equipment	EN 61000-6-4:2001	
Electromagnetic compatibility (EMC) Immunity requirements for industrial equipment	EN 61000-6-2:2001	
Machine safety - Electrical equipment of machines	EN 60204-1	
Electromagnetic compatibility directive and its amending directives	2004 / 108 / EC	
Machinery directive and its amending directives	98 / 37 / EC	
DIMENSIONS AND WEIGHT		
Height (mm)	1.872	
Width (mm)	762	
Depth (mm)	762	
Weight (kg)	826	

NOTES: ⁽¹⁾Dependent upon UPS recharge rate. ⁽²⁾At maximum power rating.

This publication is issued to provide outline information only and is not deemed to form any part of any offer and/or contract. The company has a policy of continuous product development and improvement, and we therefore reserve the right to vary any information without prior notice. **MIKA4L0UKVDCX Rev. 1-11/2008**

Chloride Systems
WORLD HEADQUARTERS

Via Fornace 30
40023 Castel Guelfo (BO)
Italy

T +39 0542 632 111
F +39 0542 632 120
E enquiries@chloridepower.com

CHLORIDE

www.chloridepower.com

Chloride operates through a worldwide network of Chloride sales and service offices and joint-ventures, with operations across 80 countries including:

Almaty, Kazakhstan
Bangkok, Thailand
Beijing, China
Makati City, Philippines

Bologna, Italy
Buenos Aires, Argentina
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Dubai, UAE
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Moscow, Russia
Paris, France
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Diadema, Brazil
Shanghai, China
Singapore

Southampton, UK
Sydney, Australia
Warsaw, Poland



Chloride Australia
Ground Floor, 16 Giffnock Avenue
North Ryde
NSW 2113
Australia
T +61 2 9888 1266
F +61 2 9888 1966
E australia.sales@chloridepower.com
www.chloridepower.com.au

Chloride Middle East
Building 5, Office 104, Dubai Internet City
Dubai
UAE
PO Box 72536
T +971 4 391 3205
F +971 4 391 6803
E middleeast.sales@chloridepower.com
www.chloridepower.com/middle-east

Chloride Secure Power Philippines, Inc.
28th Floor, Tower 2, The Enterprise Center
6766 Ayala Avenue corner Paseo de Roxas
Makati City 1226
Philippines
T +632 849 3895
F +632 886 5008
E philippines.sales@chloridepower.com
www.chloridepower.com

CHLD Singapore Pte Ltd
2 Corporation Road,
#03-07 Corporation Place
Singapore
618494
T +65 6481 4776
F +65 6481 0552
E singapore.sales@chloridepower.com
www.chloridepower.com.sg

Chloride Vietnam
Unit 1708, 17th Floor,
Gemadep Tower
06 Le Thanh Ton Street,
Ben Nghe Ward
District 1, Ho Chi Minh City
Vietnam
T +84 8 255 6737
F +84 8 255 6800
www.chloridepower.com/vn

Chloride UK
George Curl Way
Southampton
Hampshire
SO18 2RY
United Kingdom
T +44 (0) 23 8061 0311
F +44 (0) 23 8061 0852
E uk.enquiries@chloridepower.com
www.chloridepower.co.uk

Chloride North America
27944 North Bradley Road
Libertyville
IL 60048
USA
T +1 847 816 6000
F +1 800 327 8801
F +1 847 680 5124
E usa.info@chloridepower.com
www.chloridepower.com/usa

Chloride Thailand
Panjathani Tower, 20th Floor
127/25 Nonsee Road
Chongnonsee, Yannawa
Bangkok 10120
Thailand
T +662 296 9800
F +662 681 0109
E thailand.sales@chloridepower.com
www.chloridepower.com/th

For a full list of contacts please visit our website at www.chloridepower.com

