



FREEMAQ MULTI PCSK

UTILITY SCALE MULTI PCS INVERTER



POWER CONVERSION SYSTEM



FIELD REPLACEABLE UNITS



NEMA 3R / IP54



MODULAR DESIGN



ICOOL 3



4 QUADRANT



3 LEVEL TOPOLOGY

TAKING ADVANTAGE OF THE MOST FLEXIBLE 1500V INVERTER PLATFORM

The Power Electronics Freemaq Multi PCSK is a modular solution from 1600kW to 3800kW with configurable DC and AC voltages making it compatible with all battery technology and manufacturers. The Freemaq Multi PCSK can support two or three independent battery systems.

Power Electronics is a proven partner in the solar and energy storage market. The Power Electronics Freemaq Multi PCSK offers proven hardware to meet storage and grid support challenges. The energy production industry is embracing renewable energy sources. However, high penetration creates power transmission instability challenges, thus Grid Operators require stringent dynamic and static grid support features for solar inverters and Power Conversion Systems (PCS).

The Freemaq Multi PCSK can perform grid support functions such as: Peak Shaving, Ramp Rate Control, Frequency Regulation, Load Leveling and Voltage Regulation, controlled by a Power Plant Controller or SCADA. The Freemaq Multi PCSK stations are turn-key solutions ready for connection to the battery container and MV power distribution wiring. Units are designed for concrete pads or piers, open skids or integrated into full container solutions.

COMPACT DESIGN - EASY TO SERVICE

By providing full front access the Freemaq Multi PCSK series simplifies the maintenance tasks, reducing the MTTR (and achieving a lower OPEX). The total access allows a fast swap of the FRUs without the need of qualified technical personnel.

With the Freemaq Multi PCSK, Power Electronics offers its most compact solution, achieving 3.8MW in just 12ft long, reducing installation costs and labor time.



STRING CONCEPT POWER STAGES

The Freemaq Multi PCSK combines the advantages of a central inverter with the modularity of the string inverters. Its power stages are designed to be easily replaceable on the field without the need of advanced technical service personnel, providing a safe, reliable and fast Plug&Play assembly system.

Following the modular philosophy of the Freemaq series, the Multi PCSK is composed of 6 FRUs (field replaceable units).



INNOVATIVE COOLING SYSTEM

Based on more than 3 years of experience with our MV Variable Speed Drive, the iCOOL3 system allows to get IP54 degree of protection in an outdoor converter. iCOOL3 delivers a constant stream of clean air to the FRUs, being the most effective way of reaching up to IP54 degree of protection,

without having to maintain cumbersome dust filters or having to use liquid-cooling systems, avoiding the commonly known inconveniences of it (complex maintenance, risk of leaks, higher number of components...), therefore resulting in an OPEX cost reduction.



ACTIVE HEATING

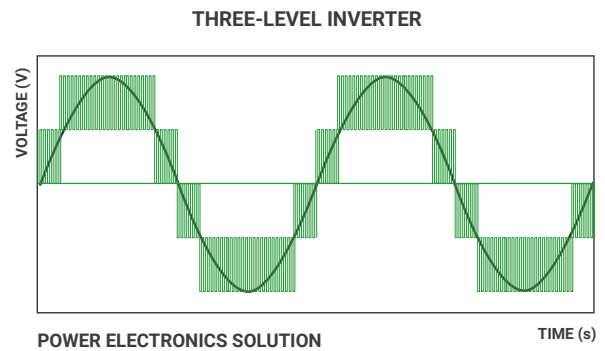
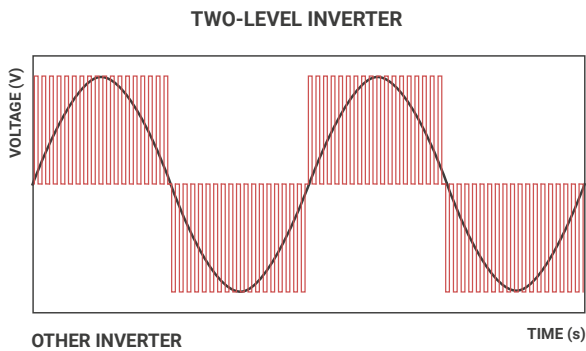
When the unit is not actively exporting power, the inverter can import a small amount of power to keep the inverter internal ambient temperature above -20°C , without using external resistors.

This autonomous heating system is the most efficient and homogeneous way to prevent condensation, increasing the inverters availability and reducing the maintenance. **PATENTED**

MULTILEVEL TOPOLOGY

The multilevel IGBT topology is the most efficient approach to manage high DC link voltages and makes the difference in the 1500 Vdc design. Power Electronics has many years of power design in both inverters and MV drives and the Freemaq

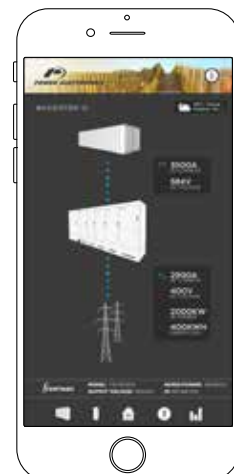
Multi PCSK design is the result of our experience with 3 level topologies. The 3 level IGBT topology reduces stage losses, increases inverter efficiency and minimizes total harmonic distortion.



EASY TO MONITOR

The Freesun app is the easiest way to monitor the status of our inverters. All our inverters come with built-in wifi, allowing remote connectivity to any smart device for detailed updates and information without the need to open cabinet doors.

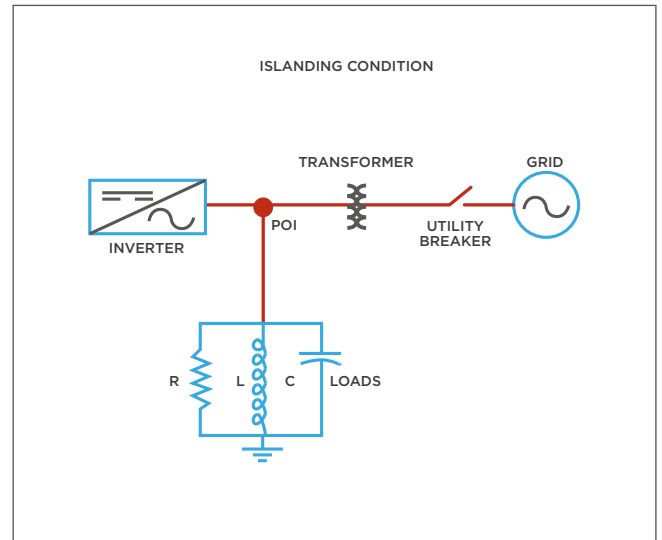
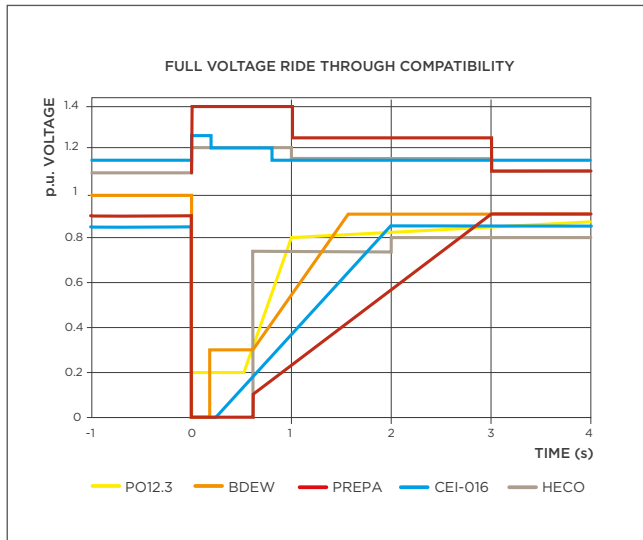
The app user friendly interface allows quick and easy access to critical information (energy registers, production and events).



AVAILABLE INFORMATION	Grid and PV field data. Inverter and Power module data (Voltages, currents, power, temperatures, I/O status...) Weather conditions. Alarms and warnings events. Energy registers. Others.
FEATURES	Easy Wireless connection. Comprehensive interface. Real time data. Save and copy settings.
LANGUAGE	English, Spanish.
SYSTEM REQUIREMENTS	iOS or Android devices.
SETTINGS CONTROL	Yes

DYNAMIC GRID SUPPORT

Freemaq Multi PCSK firmware includes the latest utility interactive features (LVRT, OVRT, FRS, FRT, Anti-islanding, active and reactive power curtailment...), and is compatible with all the specific requirements of the utilities.



LVRT or ZVRT (Low Voltage Ride Through)

Inverters can withstand any voltage dip or profile required by the local utility. In this situation, the inverter can inject current up to the nominal value.

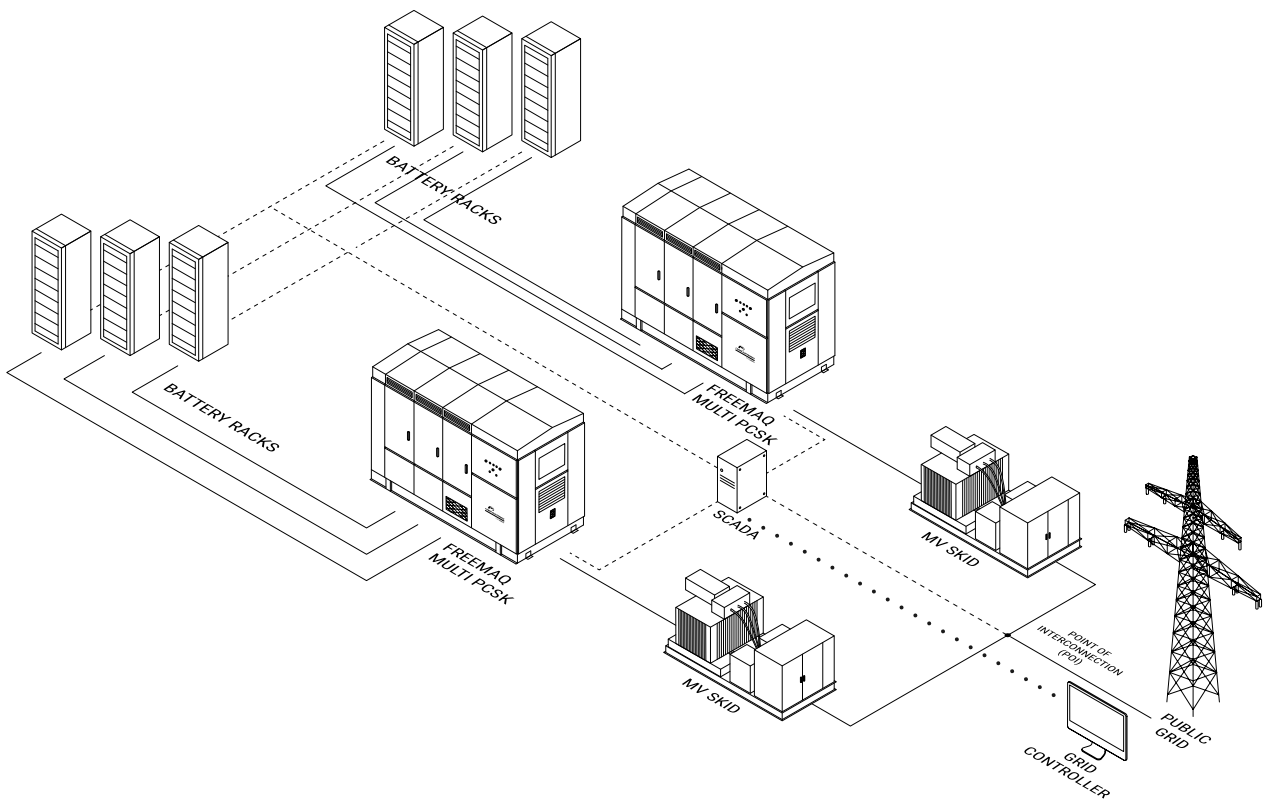
Anti-islanding

This protection combines passive and active detection methods that eliminate nuisance tripping and allow to comply with the IEC 62116 and IEEE 1547 standards.

BATTERY ENERGY STORAGE SYSTEM

A BESS comprises a battery container connected to a Freemaq Multi PCSK (Power Conversion System) that follows the instruction of the main governor of the plant, the PPC (Power Plant Controller) or SCADA.

EXAMPLE



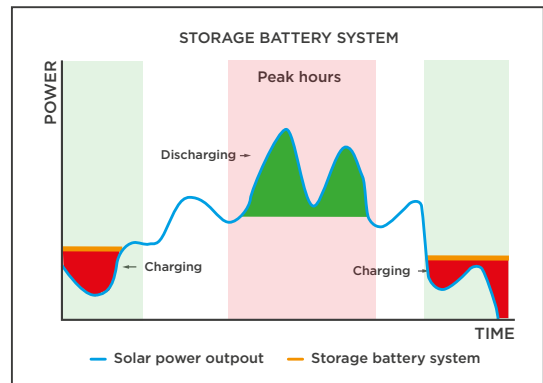
- Power connections
- — — Plant communications
- Grid controller communication

ENERGY STORAGE APPLICATIONS



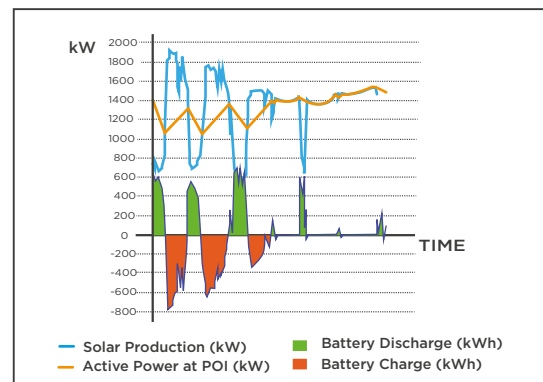
LOAD LEVELING

Freemaq Multi PCSK series are able to store energy during periods of low demand from the grid, in order to later supply this energy when there is a higher demand. This has the benefit of selling the energy at a higher market price during peak periods. It also allows grid operators to supply electricity with a higher renewable origin. Since PV generation may not be at the same time as peak demand, this facilitates the flexibility and integration of renewable generation into the grid.



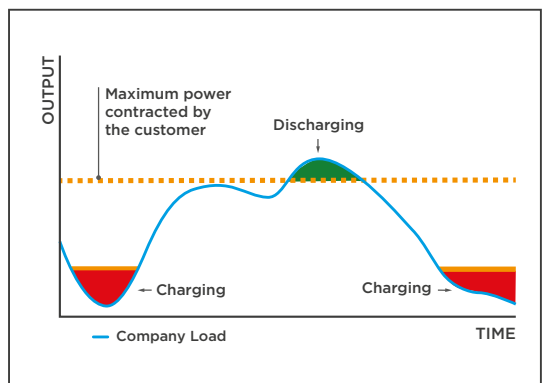
RENEWABLE INTEGRATION

The Freemaq Multi PCSK series attenuates the intermittent nature of renewable energy sources, to provide a smoother power output. The Freemaq Multi PCSK controls the ramp rate at which power is injected into the grid, and thus reduces the impact of rapid power fluctuations due to sudden or transient conditions experienced by the PV array. The system monitors the PV inverter output to inject or consume power accordingly to ensure the output remains within the ramp requirements.



PEAK POWER SHAVING

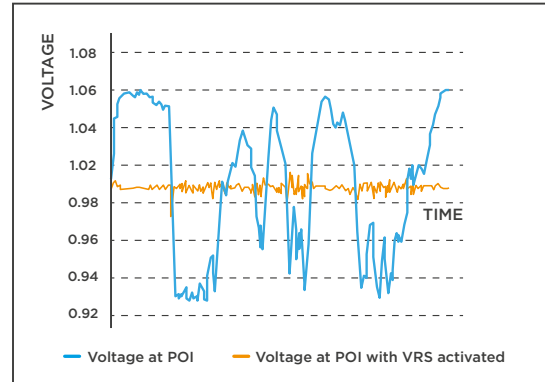
By delivering stored energy to the grid during periods of high demand, it reduces the burden on the distribution network and increases significantly its efficiency. Energy is stored instead of injected into the grid during periods of low demand, which as a result increases the load on the grid. However, during peak periods this stored energy is then injected into the grid, which reduces the demand at this time. The result is a more flattened demand curve which means the grid can avoid switching on more expensive and polluting generators.





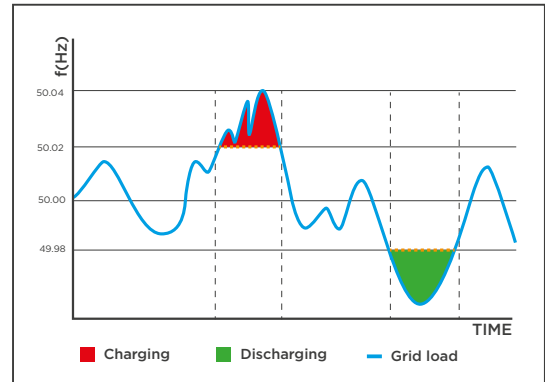
GRID SUPPORT

Freemaq Multi PCSK series helps the integration of renewable sources, by helping to maintain grid stability and power quality. It can help support the grid voltage by generating capacitive or inductive current. Other features include Voltage Control, Reactive Power Control and Fault Ride Through Support.



FREQUENCY REGULATION SYSTEM

Freemaq Multi PCSK provides ability to regulate grid frequency in both directions. When there is a grid over-frequency (generation > demand) inverter power output is curtailed and this energy is stored. When there is a grid under-frequency (generation < demand) inverter power output is increased by discharging the batteries and injecting more power to the grid.



TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSK 690V

	FRAME 1	FRAME 2
NUMBER OF MODULES	4	6
REFERENCES [†] Indicates the number of separate DC inputs	FP2300K2	FP3450K0*
AC		
AC Output Power (kVA/kW) @50°C ^[1]	2300	3450
AC Output Power (kVA/kW) @25°C ^[1]	2530	3800
Max. AC Output Current (A) @50°C	1925	2887
Max. AC Output Current (A) @25°C	2117	3175
Overload capacity ^[2]	110% (depending on preload conditions)	
Operating Grid Voltage (VAC)	690V ±10% ^[3]	
Operating Grid Frequency (Hz)	50/60 Hz	
Current Harmonic Distortion (THDi)	< 3% per IEEE519	
Power Factor (cosine phi) ^[2]	0.5 leading...0.5 lagging	
Reactive power compensation	Four quadrant operation	
DC		
DC Voltage Range (full power)	976V-1310V	
Maximum DC voltage	1500V	
DC Voltage Ripple	< 3%	
Max. DC continuous current (A)	2646	3969
Battery Technology	All type of batteries (BMS required)	
Number of separate DC inputs	2	2 or 3
EFFICIENCY & AUX. SUPPLY		
Efficiency (Max) (η)	98.8%	
Max. Standby Consumption	< approx. 50W/per module	
CABINET		
Dimensions [WxDxH] (ft)	12 x 7 x 7	
Dimensions [WxDxH] (m)	3.7 x 2.2 x 2.2	
Weight (lbs)	10802	15432
Weight (kg)	4900	7000
Type of ventilation	Forced air cooling	
ENVIRONMENT		
Degree of protection	NEMA 3R / IP54	
Permissible Ambient Temperature	-35°C to +60°C, >50°C / Active Power derating (>50°C)	
Relative Humidity	4% to 100% Condensing	
Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)	
Noise level ^[4]	< 79 dBA	
CONTROL INTERFACE		
Interface	Graphic Display (inside cabinet) / Optional Freesun App display	
Communication protocol	Modbus TCP	
Power Plant Controller	Optional. Third party SCADA systems supported	
Keyed ON/OFF switch	Standard	
Digital I/O	Optional ^[5]	
Analog I/O	Optional ^[5]	
PROTECTIONS		
Ground Fault Protection	Insulation monitoring device	
Humidity control	Active Heating	
General AC Protection & Disconn.	Circuit Breaker	
General DC Protection & Disconn.	DC switch ^[5]	
Overtoltage Protection	AC and DC protection (type 2)	
CERTIFICATIONS		
Safety	UL1741, CSA 22.2 No.107.1-16, UL62109-1, IEC62109-1, IEC62109-2	
Utility interconnect	EEE 1547.1-2005 / UL1741SA-Feb. 2018 / IEC62116:2014	

[1] Values at 1.00-Vac nom and cos Φ= 1.

Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar)=\sqrt{(S(kVA))^2-P(kW)^2}$.

[3] Consult Power Electronics for other configurations.

[4] Readings taken 1 meter from the back of the unit.

[5] Battery short circuit disconnection has to be done on the battery side.

TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSK 660V

	FRAME 1	FRAME 2
NUMBER OF MODULES	4	6
REFERENCES [*] Indicates the number of separate DC inputs	FP2200K2	FP3300K□*
AC		
AC Output Power (kVA/kW) @50°C ^[1]	2200	3300
AC Output Power (kVA/kW) @25°C ^[1]	2420	3630
Max. AC Output Current (A) @50°C	1925	2887
Max. AC Output Current (A) @25°C	2117	3175
Overload capacity ^[2]	110% (depending on preload conditions)	
Operating Grid Voltage (VAC)	660V ±10% ^[3]	
Operating Grid Frequency (Hz)	50/60 Hz	
Current Harmonic Distortion (THDi)	< 3% per IEEE519	
Power Factor (cosine phi) ^[2]	0.5 leading...0.5 lagging	
Reactive power compensation	Four quadrant operation	
DC		
DC Voltage Range (full power)	934V-1310V	
Maximum DC voltage	1500V	
DC Voltage Ripple	< 3%	
Max. DC continuous current (A)	2646	3969
Battery Technology	All type of batteries (BMS required)	
Number of separate DC inputs	2	2 or 3
EFFICIENCY & AUX. SUPPLY		
Efficiency (Max) (η)	98.8%	
Max. Standby Consumption	< approx. 50W/per module	
CABINET		
Dimensions [WxDxH] (ft)	12 x 7 x 7	
Dimensions [WxDxH] (m)	3.7 x 2.2 x 2.2	
Weight (lbs)	10802	15432
Weight (kg)	4900	7000
Type of ventilation	Forced air cooling	
ENVIRONMENT		
Degree of protection	NEMA 3R / IP54	
Permissible Ambient Temperature	-35°C to +60°C, >50°C / Active Power derating (>50°C)	
Relative Humidity	4% to 100% Condensing	
Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)	
Noise level ^[4]	< 79 dBA	
CONTROL INTERFACE		
Interface	Graphic Display (inside cabinet) / Optional Freesun App display	
Communication protocol	Modbus TCP	
Power Plant Controller	Optional. Third party SCADA systems supported	
Keyed ON/OFF switch	Standard	
Digital I/O	Optional ^[3]	
Analog I/O	Optional ^[3]	
PROTECTIONS		
Ground Fault Protection	Insulation monitoring device	
Humidity control	Active Heating	
General AC Protection & Disconn.	Circuit Breaker	
General DC Protection & Disconn.	DC switch ^[5]	
Overvoltage Protection	AC and DC protection (type 2)	
CERTIFICATIONS		
Safety	UL1741, CSA 22.2 No.107.1-16, UL62109-1, IEC62109-1, IEC62109-2	
Utility interconnect	EEE 1547.1-2005 / UL1741SA-Feb. 2018 / IEC62116:2014	

[1] Values at 1.00·Vac nom and cos Φ= 1.

Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar)=\sqrt{(S(kVA))^2-P(kW)^2}$.

[3] Consult Power Electronics for other configurations.

[4] Readings taken 1 meter from the back of the unit.

[5] Battery short circuit disconnection has to be done on the battery side.

TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSK 645V

	FRAME 1	FRAME 2
NUMBER OF MODULES	4	6
REFERENCES [1] Indicates the number of separate DC inputs	FP2150K2	FP3225K0*
AC		
AC Output Power (kVA/kW) @50°C ^[1]	2150	3225
AC Output Power (kVA/kW) @25°C ^[1]	2365	3550
Max. AC Output Current (A) @50°C	1925	2887
Max. AC Output Current (A) @25°C	2117	3175
Overload capacity ^[2]	110% (depending on preload conditions)	
Operating Grid Voltage (VAC)	645V ±10% ^[3]	
Operating Grid Frequency (Hz)	50/60 Hz	
Current Harmonic Distortion (THDi)	< 3% per IEEE519	
Power Factor (cosine phi) ^[2]	0.5 leading...0.5 lagging	
Reactive power compensation	Four quadrant operation	
DC		
DC Voltage Range (full power)	913V-1310V	
Maximum DC voltage	1500V	
DC Voltage Ripple	< 3%	
Max. DC continuous current (A)	2646	3969
Battery Technology	All type of batteries (BMS required)	
Number of separate DC inputs	2	2 or 3
EFFICIENCY & AUX. SUPPLY		
Efficiency (Max) (η)	98.8%	
Max. Standby Consumption	< approx. 50W/per module	
CABINET		
Dimensions [WxDxH] (ft)	12 x 7 x 7	
Dimensions [WxDxH] (m)	3.7 x 2.2 x 2.2	
Weight (lbs)	10802	15432
Weight (kg)	4900	7000
Type of ventilation	Forced air cooling	
ENVIRONMENT		
Degree of protection	NEMA 3R / IP54	
Permissible Ambient Temperature	-35°C to +60°C, >50°C / Active Power derating (>50°C)	
Relative Humidity	4% to 100% Condensing	
Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)	
Noise level ^[4]	< 79 dBA	
CONTROL INTERFACE		
Interface	Graphic Display (inside cabinet) / Optional Freesun App display	
Communication protocol	Modbus TCP	
Power Plant Controller	Optional. Third party SCADA systems supported	
Keyed ON/OFF switch	Standard	
Digital I/O	Optional ^[5]	
Analog I/O	Optional ^[5]	
PROTECTIONS		
Ground Fault Protection	Insulation monitoring device	
Humidity control	Active Heating	
General AC Protection & Disconn.	Circuit Breaker	
General DC Protection & Disconn.	DC switch ^[5]	
Overtoltage Protection	AC and DC protection (type 2)	
CERTIFICATIONS		
Safety	UL1741, CSA 22.2 No.107.1-16, UL62109-1, IEC62109-1, IEC62109-2	
Utility interconnect	EEE 1547.1-2005 / UL1741SA-Feb. 2018 / IEC62116:2014	

[1] Values at 1.00-Vac nom and cos Φ= 1.

Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar)=\sqrt{(S(kVA))^2-P(kW)^2}$.

[3] Consult Power Electronics for other configurations.

[4] Readings taken 1 meter from the back of the unit.

[5] Battery short circuit disconnection has to be done on the battery side.

TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSK 630V

	FRAME 1	FRAME 2
NUMBER OF MODULES	4	6
REFERENCES [*] Indicates the number of separate DC inputs	FP2100K2	FP3150K□*
AC		
AC Output Power (kVA/kW) @50°C ^[1]	2100	3150
AC Output Power (kVA/kW) @25°C ^[1]	2310	3465
Max. AC Output Current (A) @50°C	1925	2887
Max. AC Output Current (A) @25°C	2117	3175
Overload capacity ^[2]	110% (depending on preload conditions)	
Operating Grid Voltage (VAC)	630V ±10% ^[3]	
Operating Grid Frequency (Hz)	50/60 Hz	
Current Harmonic Distortion (THDi)	< 3% per IEEE519	
Power Factor (cosine phi) ^[2]	0.5 leading...0.5 lagging	
Reactive power compensation	Four quadrant operation	
DC		
DC Voltage Range (full power)	891V-1310V	
Maximum DC voltage	1500V	
DC Voltage Ripple	< 3%	
Max. DC continuous current (A)	2646	3969
Battery Technology	All type of batteries (BMS required)	
Number of separate DC inputs	2	2 or 3
EFFICIENCY & AUX. SUPPLY		
Efficiency (Max) (η)	98.8%	
Max. Standby Consumption	< approx. 50W/per module	
CABINET		
Dimensions [WxDxH] (ft)	12 x 7 x 7	
Dimensions [WxDxH] (m)	3.7 x 2.2 x 2.2	
Weight (lbs)	10802	15432
Weight (kg)	4900	7000
Type of ventilation	Forced air cooling	
ENVIRONMENT		
Degree of protection	NEMA 3R / IP54	
Permissible Ambient Temperature	-35°C to +60°C, >50°C / Active Power derating (>50°C)	
Relative Humidity	4% to 100% Condensing	
Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)	
Noise level ^[4]	< 79 dBA	
CONTROL INTERFACE		
Interface	Graphic Display (inside cabinet) / Optional Freesun App display	
Communication protocol	Modbus TCP	
Power Plant Controller	Optional. Third party SCADA systems supported	
Keyed ON/OFF switch	Standard	
Digital I/O	Optional ^[3]	
Analog I/O	Optional ^[3]	
PROTECTIONS		
Ground Fault Protection	Insulation monitoring device	
Humidity control	Active Heating	
General AC Protection & Disconn.	Circuit Breaker	
General DC Protection & Disconn.	DC switch ^[5]	
Overvoltage Protection	AC and DC protection (type 2)	
CERTIFICATIONS		
Safety	UL1741, CSA 22.2 No.107.1-16, UL62109-1, IEC62109-1, IEC62109-2	
Utility interconnect	EEE 1547.1-2005 / UL1741SA-Feb. 2018 / IEC62116:2014	

[1] Values at 1.00·Vac nom and cos Φ= 1.

Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar)=\sqrt{(S(kVA))^2-P(kW)^2}$.

[3] Consult Power Electronics for other configurations.

[4] Readings taken 1 meter from the back of the unit.

[5] Battery short circuit disconnection has to be done on the battery side.

TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSK 615V

	FRAME 1	FRAME 2
NUMBER OF MODULES	4	6
REFERENCES [1] Indicates the number of separate DC inputs	FP2050K2	FP3075K0*
AC		
AC Output Power (kVA/kW) @50°C ^[1]	2050	3075
AC Output Power (kVA/kW) @25°C ^[1]	2255	3380
Max. AC Output Current (A) @50°C	1925	2887
Max. AC Output Current (A) @25°C	2117	3175
Overload capacity ^[2]	110% (depending on preload conditions)	
Operating Grid Voltage (VAC)	615V ±10% ^[3]	
Operating Grid Frequency (Hz)	50/60 Hz	
Current Harmonic Distortion (THDi)	< 3% per IEEE519	
Power Factor (cosine phi) ^[2]	0.5 leading...0.5 lagging	
Reactive power compensation	Four quadrant operation	
DC		
DC Voltage Range (full power)	870V-1310V	
Maximum DC voltage	1500V	
DC Voltage Ripple	< 3%	
Max. DC continuous current (A)	2646	3969
Battery Technology	All type of batteries (BMS required)	
Number of separate DC inputs	2	2 or 3
EFFICIENCY & AUX. SUPPLY		
Efficiency (Max) (η)	98.8%	
Max. Standby Consumption	< approx. 50W/per module	
CABINET		
Dimensions [WxDxH] (ft)	12 x 7 x 7	
Dimensions [WxDxH] (m)	3.7 x 2.2 x 2.2	
Weight (lbs)	10802	15432
Weight (kg)	4900	7000
Type of ventilation	Forced air cooling	
ENVIRONMENT		
Degree of protection	NEMA 3R / IP54	
Permissible Ambient Temperature	-35°C to +60°C, >50°C / Active Power derating (>50°C)	
Relative Humidity	4% to 100% Condensing	
Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)	
Noise level ^[4]	< 79 dBA	
CONTROL INTERFACE		
Interface	Graphic Display (inside cabinet) / Optional Freesun App display	
Communication protocol	Modbus TCP	
Power Plant Controller	Optional. Third party SCADA systems supported	
Keyed ON/OFF switch	Standard	
Digital I/O	Optional ^[5]	
Analog I/O	Optional ^[5]	
PROTECTIONS		
Ground Fault Protection	Insulation monitoring device	
Humidity control	Active Heating	
General AC Protection & Disconn.	Circuit Breaker	
General DC Protection & Disconn.	DC switch ^[5]	
Overtoltage Protection	AC and DC protection (type 2)	
CERTIFICATIONS		
Safety	UL1741, CSA 22.2 No.107.1-16, UL62109-1, IEC62109-1, IEC62109-2	
Utility interconnect	EEE 1547.1-2005 / UL1741SA-Feb. 2018 / IEC62116:2014	

[1] Values at 1.00-Vac nom and cos Φ= 1.

Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar)=\sqrt{(S(kVA))^2-P(kW)^2}$.

[3] Consult Power Electronics for other configurations.

[4] Readings taken 1 meter from the back of the unit.

[5] Battery short circuit disconnection has to be done on the battery side.

TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSK 600V

	FRAME 1	FRAME 2
NUMBER OF MODULES	4	6
REFERENCES [*] Indicates the number of separate DC inputs	FP2000K2	FP3000K□*
AC		
AC Output Power (kVA/kW) @50°C ^[1]	2000	3000
AC Output Power (kVA/kW) @25°C ^[1]	2200	3300
Max. AC Output Current (A) @50°C	1925	2887
Max. AC Output Current (A) @25°C	2117	3175
Overload capacity ^[2]	110% (depending on preload conditions)	
Operating Grid Voltage (VAC)	600V ±10% ^[3]	
Operating Grid Frequency (Hz)	50/60 Hz	
Current Harmonic Distortion (THDi)	< 3% per IEEE519	
Power Factor (cosine phi) ^[2]	0.5 leading...0.5 lagging	
Reactive power compensation	Four quadrant operation	
DC		
DC Voltage Range (full power)	849V-1310V	
Maximum DC voltage	1500V	
DC Voltage Ripple	< 3%	
Max. DC continuous current (A)	2646	3969
Battery Technology	All type of batteries (BMS required)	
Number of separate DC inputs	2	2 or 3
EFFICIENCY & AUX. SUPPLY		
Efficiency (Max) (η)	98.8%	
Max. Standby Consumption	< approx. 50W/per module	
CABINET		
Dimensions [WxDxH] (ft)	12 x 7 x 7	
Dimensions [WxDxH] (m)	3.7 x 2.2 x 2.2	
Weight (lbs)	10802	15432
Weight (kg)	4900	7000
Type of ventilation	Forced air cooling	
ENVIRONMENT		
Degree of protection	NEMA 3R / IP54	
Permissible Ambient Temperature	-35°C to +60°C, >50°C / Active Power derating (>50°C)	
Relative Humidity	4% to 100% Condensing	
Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)	
Noise level ^[4]	< 79 dBA	
CONTROL INTERFACE		
Interface	Graphic Display (inside cabinet) / Optional Freesun App display	
Communication protocol	Modbus TCP	
Power Plant Controller	Optional. Third party SCADA systems supported	
Keyed ON/OFF switch	Standard	
Digital I/O	Optional ^[3]	
Analog I/O	Optional ^[3]	
PROTECTIONS		
Ground Fault Protection	Insulation monitoring device	
Humidity control	Active Heating	
General AC Protection & Disconn.	Circuit Breaker	
General DC Protection & Disconn.	DC switch ^[5]	
Overvoltage Protection	AC and DC protection (type 2)	
CERTIFICATIONS		
Safety	UL1741, CSA 22.2 No.107.1-16, UL62109-1, IEC62109-1, IEC62109-2	
Utility interconnect	EEE 1547.1-2005 / UL1741SA-Feb. 2018 / IEC62116:2014	

[1] Values at 1.00·Vac nom and cos Φ= 1.

Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar)=\sqrt{(S(kVA))^2-P(kW)^2}$.

[3] Consult Power Electronics for other configurations.

[4] Readings taken 1 meter from the back of the unit.

[5] Battery short circuit disconnection has to be done on the battery side.

TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSK 530V

	FRAME 1	FRAME 2
NUMBER OF MODULES	4	6
REFERENCES [1] Indicates the number of separate DC inputs	FP1765K2	FP2650K0*
AC		
AC Output Power (kVA/kW) @50°C ^[1]	1765	2650
AC Output Power (kVA/kW) @25°C ^[1]	1940	2915
Max. AC Output Current (A) @50°C	1925	2887
Max. AC Output Current (A) @25°C	2117	3175
Overload capacity ^[2]	110% (depending on preload conditions)	
Operating Grid Voltage (VAC)	530V ±10% ^[3]	
Operating Grid Frequency (Hz)	50/60 Hz	
Current Harmonic Distortion (THDi)	< 3% per IEEE519	
Power Factor (cosine phi) ^[2]	0.5 leading...0.5 lagging	
Reactive power compensation	Four quadrant operation	
DC		
DC Voltage Range (full power)	750V-1310V	
Maximum DC voltage	1500V	
DC Voltage Ripple	< 3%	
Max. DC continuous current (A)	2646	3969
Battery Technology	All type of batteries (BMS required)	
Number of separate DC inputs	2	2 or 3
EFFICIENCY & AUX. SUPPLY		
Efficiency (Max) (η)	98.8%	
Max. Standby Consumption	< approx. 50W/per module	
CABINET		
Dimensions [WxDxH] (ft)	12 x 7 x 7	
Dimensions [WxDxH] (m)	3.7 x 2.2 x 2.2	
Weight (lbs)	10802	15432
Weight (kg)	4900	7000
Type of ventilation	Forced air cooling	
ENVIRONMENT		
Degree of protection	NEMA 3R / IP54	
Permissible Ambient Temperature	-35°C to +60°C, >50°C / Active Power derating (>50°C)	
Relative Humidity	4% to 100% Condensing	
Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)	
Noise level ^[4]	< 79 dBA	
CONTROL INTERFACE		
Interface	Graphic Display (inside cabinet) / Optional Freesun App display	
Communication protocol	Modbus TCP	
Power Plant Controller	Optional. Third party SCADA systems supported	
Keyed ON/OFF switch	Standard	
Digital I/O	Optional ^[5]	
Analog I/O	Optional ^[5]	
PROTECTIONS		
Ground Fault Protection	Insulation monitoring device	
Humidity control	Active Heating	
General AC Protection & Disconn.	Circuit Breaker	
General DC Protection & Disconn.	DC switch ^[5]	
Overtoltage Protection	AC and DC protection (type 2)	
CERTIFICATIONS		
Safety	UL1741, CSA 22.2 No.107.1-16, UL62109-1, IEC62109-1, IEC62109-2	
Utility interconnect	EEE 1547.1-2005 / UL1741SA-Feb. 2018 / IEC62116:2014	

[1] Values at 1.00-Vac nom and cos Φ= 1.

Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar)=\sqrt{(S(kVA))^2-P(kW)^2}$.

[3] Consult Power Electronics for other configurations.

[4] Readings taken 1 meter from the back of the unit.

[5] Battery short circuit disconnection has to be done on the battery side.

TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSK 500V

	FRAME 1	FRAME 2
NUMBER OF MODULES	4	6
REFERENCES [*] Indicates the number of separate DC inputs	FP1665K2	FP2500K□*
AC		
AC Output Power (kVA/kW) @50°C ^[1]	1665	2500
AC Output Power (kVA/kW) @25°C ^[1]	1830	2750
Max. AC Output Current (A) @50°C	1925	2887
Max. AC Output Current (A) @25°C	2117	3175
Overload capacity ^[2]	110% (depending on preload conditions)	
Operating Grid Voltage (VAC)	500V ±10% ^[3]	
Operating Grid Frequency (Hz)	50/60 Hz	
Current Harmonic Distortion (THDi)	< 3% per IEEE519	
Power Factor (cosine phi) ^[2]	0.5 leading...0.5 lagging	
Reactive power compensation	Four quadrant operation	
DC		
DC Voltage Range (full power)	708V-1310V	
Maximum DC voltage	1500V	
DC Voltage Ripple	< 3%	
Max. DC continuous current (A)	2646	3969
Battery Technology	All type of batteries (BMS required)	
Number of separate DC inputs	2	2 or 3
EFFICIENCY & AUX. SUPPLY		
Efficiency (Max) (η)	98.8%	
Max. Standby Consumption	< approx. 50W/per module	
CABINET		
Dimensions [WxDxH] (ft)	12 x 7 x 7	
Dimensions [WxDxH] (m)	3.7 x 2.2 x 2.2	
Weight (lbs)	10802	15432
Weight (kg)	4900	7000
Type of ventilation	Forced air cooling	
ENVIRONMENT		
Degree of protection	NEMA 3R / IP54	
Permissible Ambient Temperature	-35°C to +60°C, >50°C / Active Power derating (>50°C)	
Relative Humidity	4% to 100% Condensing	
Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)	
Noise level ^[4]	< 79 dBA	
CONTROL INTERFACE		
Interface	Graphic Display (inside cabinet) / Optional Freesun App display	
Communication protocol	Modbus TCP	
Power Plant Controller	Optional. Third party SCADA systems supported	
Keyed ON/OFF switch	Standard	
Digital I/O	Optional ^[3]	
Analog I/O	Optional ^[3]	
PROTECTIONS		
Ground Fault Protection	Insulation monitoring device	
Humidity control	Active Heating	
General AC Protection & Disconn.	Circuit Breaker	
General DC Protection & Disconn.	DC switch ^[5]	
Overvoltage Protection	AC and DC protection (type 2)	
CERTIFICATIONS		
Safety	UL1741, CSA 22.2 No.107.1-16, UL62109-1, IEC62109-1, IEC62109-2	
Utility interconnect	EEE 1547.1-2005 / UL1741SA-Feb. 2018 / IEC62116:2014	

[1] Values at 1.00·Vac nom and cos Φ= 1.

Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar)=\sqrt{(S(kVA))^2-P(kW)^2}$.

[3] Consult Power Electronics for other configurations.

[4] Readings taken 1 meter from the back of the unit.

[5] Battery short circuit disconnection has to be done on the battery side.

TECHNICAL CHARACTERISTICS

FREEMAQ MULTI PCSK 480V

	FRAME 1	FRAME 2
NUMBER OF MODULES	4	6
REFERENCES [†] Indicates the number of separate DC inputs	FP1600K2	FP2400K0*
AC		
AC Output Power (kVA/kW) @50°C ^[1]	1600	2400
AC Output Power (kVA/kW) @25°C ^[1]	1760	2640
Max. AC Output Current (A) @50°C	1925	2887
Max. AC Output Current (A) @25°C	2117	3175
Overload capacity ^[2]	110% (depending on preload conditions)	
Operating Grid Voltage (VAC)	480V ±10% ^[3]	
Operating Grid Frequency (Hz)	50/60 Hz	
Current Harmonic Distortion (THDi)	< 3% per IEEE519	
Power Factor (cosine phi) ^[2]	0.5 leading...0.5 lagging	
Reactive power compensation	Four quadrant operation	
DC		
DC Voltage Range (full power)	679V-1310V	
Maximum DC voltage	1500V	
DC Voltage Ripple	< 3%	
Max. DC continuous current (A)	2646	3969
Battery Technology	All type of batteries (BMS required)	
Number of separate DC inputs	2	2 or 3
EFFICIENCY & AUX. SUPPLY		
Efficiency (Max) (η)	98.8%	
Max. Standby Consumption	< approx. 50W/per module	
CABINET		
Dimensions [WxDxH] (ft)	12 x 7 x 7	
Dimensions [WxDxH] (m)	3.7 x 2.2 x 2.2	
Weight (lbs)	10802	15432
Weight (kg)	4900	7000
Type of ventilation	Forced air cooling	
ENVIRONMENT		
Degree of protection	NEMA 3R / IP54	
Permissible Ambient Temperature	-35°C to +60°C, >50°C / Active Power derating (>50°C)	
Relative Humidity	4% to 100% Condensing	
Max. Altitude (above sea level)	2000m / >2000m power derating (Max. 4000m)	
Noise level ^[4]	< 79 dBA	
CONTROL INTERFACE		
Interface	Graphic Display (inside cabinet) / Optional Freesun App display	
Communication protocol	Modbus TCP	
Power Plant Controller	Optional. Third party SCADA systems supported	
Keyed ON/OFF switch	Standard	
Digital I/O	Optional ^[5]	
Analog I/O	Optional ^[5]	
PROTECTIONS		
Ground Fault Protection	Insulation monitoring device	
Humidity control	Active Heating	
General AC Protection & Disconn.	Circuit Breaker	
General DC Protection & Disconn.	DC switch ^[5]	
Overtoltage Protection	AC and DC protection (type 2)	
CERTIFICATIONS		
Safety	UL1741, CSA 22.2 No.107.1-16, UL62109-1, IEC62109-1, IEC62109-2	
Utility interconnect	EEE 1547.1-2005 / UL1741SA-Feb. 2018 / IEC62116:2014	

[1] Values at 1.00-Vac nom and cos Φ= 1.

Consult Power Electronics for derating curves.

[2] Consult P-Q charts available: $Q(kVar)=\sqrt{(S(kVA))^2-P(kW)^2}$.

[3] Consult Power Electronics for other configurations.

[4] Readings taken 1 meter from the back of the unit.

[5] Battery short circuit disconnection has to be done on the battery side.