

CONV-MAK FC Series Frequency Converters

10 kVA / 10 kW Frequency Converter 380V 50Hz / 208V 400Hz























Industrial Applications



Outdoor Solutions





Harbour Ground Units

- True On Line-Double Conversion Technology (Class VFI-SS-111)
- IGBT PWM Rectifier & Inverter Technology DSP Control
- Industrial Application
- O Low Input Current THD (<3%)</p>
- High Input Power Factor (>0.99)
- O High Efficiency up to 93%
- Optional Dual Input
- Wide Input Voltage Range
- If Needed Battery Connection Possibility & Perfect Battery Management
- Short Circuit and Overload Protection
- Unlimited Number of Paralleled Modules
- Perfect Sinus Output and Strong Protection and SNMP Control
- O Perfect for Industrial, Radar and Customized Solution
- Overload and Short Circuit Protection
- Small Footprint and Easy Maintenance
- Advanced Communication Capabilities
- Perfect Generator Compatibility
- O Customizable as Customer Need for Radar Systems and Air Plane
- © 50Hz / 60Hz / 200Hz / 400Hz IP21 IP22 IP33 IP44 IP55



10kVA - 30kW / 400V - 208V **Frequency Converter**





Technical Advantages of CONV-MAK FC Outdoor

The CONV-MAK FC Outdoor Series An Advanced Converter Technology

FC Series is a true Online Double Conversion, new generation fully digital controlled converter. It is designed with high efficiency and robust comply high availability power needs of a wide variety of critical applications and delivers advanced power solution with low cost of ownership.

High Performance Power Protection Designed for Maximum Efficiency and Flexibility

Equipped with its new IGBT rectifier FC series keeps your critical loads protected while its space-saving compact design and front access for maintenance successfully reduce mean time to repair (MTTR).

Thanks to the wide variety of accessories and options FC Series presents maximum flexibility advantage to users and optimizes total cost of ownership.

DSP Power Factor Corrected IGBT Rectifier

IGBT based power factor correction technology provides Input Power Factor close to 1 (≥0.99) and keeps Input Current Total Harmonic Distortion (THDi) less than 3%, that helps to avoid the disturbance.

Low Input Current THD

(THDi) less than 3% avoids the disturbance to connected loads

Digital Control System

All of the control functions for FC industrial Series Converter including power-on, start-up control, input stage power factor control, If needed battery charging and boosting control, output stage ac voltage regulation and shut-down control, can be realized by using a single DSP control board.

High Input Power Factor

0,99 Input power factor ensures clean and sinusoidal input current. The high input power leads to reduced electricity pay-out, minimizes cable, switchboard, fuse and generator requirements, thus reducing investment cost.

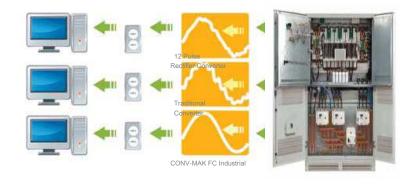
High Efficiency & Low Total Cost of Ownership

With its high efficiency up to 93% FC Series Converter consumes less energy to supply the loads. Thanks to this high efficiency rate, the percentage of energy that is produced as heat is reduced to a miminum. As a result of decreased heat emission users can reduce their electricity usage and air conditioning requirements.

Flexibility of The Converter

FC is compatible with wide range of application. Flexibility achieved through many choices, including type of battery, single or multi-unit configuration, accessories and options.

- Battery connected converter mode
- Optional temperature sensor for external battery cabinets (to assist the recharge voltage compensation)
- O Additional protection via redundant solutions
- Optional separated bypass with additional converter
- Solution transformers to vary neutral connectivity in the event of separate power sources or for galvanic isolation between input and output
- $\ensuremath{\bigcirc}$ Customized dimensions if needed for your projects till IP54



	THD	Power Factor
CONV-MAK FC-Marine with IGBT Rectifier	<3%	<0.99
Traditional Converter with Input Filter	<10%	<0.95
Converter without Input Filter	<25%	<0.85



Technical Advantages of CONV-MAK FC Outdoor

Auto Restart

When the main and additional converter or the connected bypass sources fails, the Converter draws the power from the battery system if needed to supply the load until the batteries are depleted. Or when the energy supply fails and after the utility power is restored the converter will restored the needed frequency and energy.

When Converter will reach its end of discharge or without energy, So the converter will shut down.

The Converter will automatically restart and enable output power:

- O After utility power is restored
- O After the "Auto Start Delay Time" is expired (the default delay is 5 minutes) .

EPO(Emergency Power Off)

EPO function is designed to switch off the converter in emergency conditions (fire, flood, etc.). The system will turn off the rectifier, inverter and will stop powering the load immediately (including the inverter and busbar).

Reverse Energy Tolerance for Regenerative Loads

The FC-industrial Converter can be used with regenerative loads, such as synchronous motors. The regenerative loads pump the energy back to mains, traditional systems burn this feedback energy and this causes lower efficiency. Boxer Series with IGBT rectifier are able to absorb intermittent load generated power. Additionally, this reverse power tolerance permits execution of important system operations like closed transition transfers of the Converter load directly to an engine generator Source if connected.

Advanced User Interface

The Converter has Large and user-friendly 320x240 LCD display that provides operating information in four different languages. Thanks to this advanced LCD display all parameters of working device can be monitored and controlled. Converter Is capable of recording up to 500 events and 180 Parameters/event.

Parallel Operation

FC-industrial Series features easy and simple scalability and redundancy. It is ready to grow with your business demands. Different power rated units and any number of Converters can be connected in parallel.

Power Increase: The converter's can be connected in parallel to increase total capacity of the system. If one of the devices goes out of order, the critical loads are transferred to by-pass.

Parallel Operation Features :

- Internal standard parallel microprocessor for all models.
- O Up to 16 units parallel able as customized.
- Autosensing disconnected parallel cable
- Equal current share with DSP control
- Easy power upgrade without any interruption
- All parallel systems can be controlled from the front panel of one unit
- Full synchronization of parallel units
- Isolated parallel operation card
- Static by-pass for the power security if needed.





Vibration Reduction





CONV-MAK FC Series Industrial Solution Specifications

Power Variaty Power Variaty 10 MUN Using Range 3800 or 4000 or 415 V or 440 or 480V - 10% + 10% 9P-NH-PE (************************************	Capacity	10KVA With BV "Bureau Veritas" Certificate if Needed	
Input Voltage Range 3807 or 4007 or 415 V or 440 or 4507 + 10% 3P+N+PET (*Optional Three Phases 2307*) Delta Commedded Input Power Factor A Full Load - 9.09 Input Power Pactor A Full Load - 9.09 Input Power Pactor A Full Load - 9.09 Input Power Pactor A Full Power Pacto	Power Watt	10 kW	
Input Finguinery Range 45 of 8 hz (Selectable) W/56 Range Optional 40 hz - 70 hz	INPUT		
Routifier GST GST Total Harmonic Distortion (THDI)	Input Voltage Range	380V or 400V or 415 V or 440 or 480V -10% +10% 3P+N+PE / "Optional Three Phase 230V" Delta Connected	
Rectifier 1GBT Total Hamonic Disortion (THOI) 4.3% OUTPUT Control OUTPUT Voltage Range 2087 3P+N+PE / 660Hz & Delta or Star Connected / Please Confirm Recovery 1% Beach to Band < 40ms	Input Power Factor	At Full Load >0.99	
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Output Voltage Range 208V 3P+N+PE / 60Hz & Delta or Star Connected / Please Confirm Recovery 1% Back to Band <40ms Efficiency Online Mode Up to 89% Output Frequency Range 400Hz ±0.1% Synchronous With the Network / "Optional 50Hz or 60Hz ±9.01% Battery Mode or 83Hz or 200Hz or 400Hz" THD (THDV) Lineer Load <2% Crest Factor (CF) 3:1 Overload Capacity* All 125% Load 10min, at 150% Load 1min COMMUNICATION RS232 Standart, RS485, SNMP Adapter Option & Dry Contact Card Ory Contact Optional Protector SEC, TELNET STANDARDS ISO 9001 - ISO 14001 - ISO 18001 Performance ENS2004 - 3 (VFL-SS-111) EMCALVD ENS2004 - 3 (VFL-SS-111) EMCALVD ENS2004 - 3 (VFL-SS-111) EMCALVD Customized 0 "C-45"C Fresh Air Cooling with Special Design & "Optional - 5"C-56"C or -10"C-60"C With Air Conditioners" Storage Temperature Customized 0 "C-45"C Fresh Air Cooling with Special Design & "Optional - 5"C-56"C or -10"C-60"C With Air Conditioners and Air Russian Air Russi	Total Harmonic Distortion (THDi)	<3%	
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Protection Class Chassis & Humidity Screen Optional: 4x20mm or 320mm x 240mm or Touch or & Outdoor Screen & With Mimic Diagram Languages English, German, Spanish & Russian Altitude Altitude Altitude Altitude Altitude Altitude Altitude Altitude Altitude Alerts Alerts Alerts Aparallel Operation Optional: Parallel Power Increase up to 4pcs. And Customized Solutions As Well EPO (Emergency Power Off) Standard <1000m, Correction Factor 1. <2000m, Correction Factor >0.92, <3000m; Correction Factor >0.84 Isolation Transformer Optional Net Weight (kg) Dimensions (WxDxH) (mm) Dimensions: 800 x 800 x 1600 / Packed: W850mmxD850mmxH1750mm	Running Temperature	Customized 0°C~45°C Fresh Air Cooling with Special Design & "Optional -5°C~55°C or -10°C~60°C With Air Conditioners"	
Chassis & Humidity Screen Optional: 4x20mm or 320mm x 240mm or Touch or & Outdoor Screen & With Mimic Diagram Languages English, German, Spanish & Russian Altitude Anti-Static Paint Protection & 0-95% Autitude Altitude Altitude Anti-Static Paint Protection & Outdoor Screen & With Mimic Diagram Languages English, German, Spanish & Russian Altitude Antitude Altitude Alti	Storage Temperature	0°C ~45°C	
Optional: 4x20mm or 320mm x 240mm or Touch or & Outdoor Screen & With Mimic Diagram Languages English, German, Spanish & Russian Altitude <a <="" href="#" td=""><td>Protection Class</td><td>Industrial Standard IP20</td>	Protection Class	Industrial Standard IP20	
Altitude <a (emergency="" 1.="" 4pcs.="" <1000m,="" <2000m,="" and="" as="" correction="" customized="" epo="" excel="" factor="" href="</td><td>Chassis & Humidity</td><td>Anti-Static Paint Protection &0-95%</td></tr><tr><td>Alerts 500 Event Logs & 180 Parameters for Each Log " increase="" off)="" operation="" optional:="" parallel="" power="" sheet"="" solutions="" standard="" to="" up="" well="">0.92, <3000m; Correction Factor >0.84 Isolation Transformer Optional Net Weight (kg) 220kg / Packed 240kg Dimensions (WxDxH) (mm) Dimensions: 800 x 800 x 1600 / Packed: W850mmxD850mmxH1750mm	Screen	Optional: 4x20mm or 320mm x 240mm or Touch or & Outdoor Screen & With Mimic Diagram Languages English, German, Spanish & Russian	
Parallel Operation Optional: Parallel Power Increase up to 4pcs. And Customized Solutions As Well EPO (Emergency Power Off) Standard <1000m, Correction Factor 1. <2000m, Correction Factor >0.92, <3000m; Correction Factor >0.84 Isolation Transformer Optional Net Weight (kg) 220kg / Packed 240kg Dimensions (WxDxH) (mm) Dimensions: 800 x 800 x 1600 / Packed: W850mmxD850mmxH1750mm	Altitude	<1000Meter @35°C & <1500Meter @30°C & after 1500Meter for Each Meter %1 Loss	
Parallel Operation Optional: Parallel Power Increase up to 4pcs. And Customized Solutions As Well EPO (Emergency Power Off) Standard <1000m, Correction Factor 1. <2000m, Correction Factor >0.92, <3000m; Correction Factor >0.84 Isolation Transformer Optional Net Weight (kg) 220kg / Packed 240kg Dimensions (WxDxH) (mm) Dimensions: 800 x 800 x 1600 / Packed: W850mmxD850mmxH1750mm	Alerts	500 Event Logs & 180 Parameters for Each Log "As Excel Sheet"	
Isolation Transformer Optional Net Weight (kg) 220kg / Packed 240kg Dimensions (WxDxH) (mm) Dimensions: 800 x 800 x 1600 / Packed: W850mmxD850mmxH1750mm	Parallel Operation		
Net Weight (kg) 220kg / Packed 240kg Dimensions (WxDxH) (mm) Dimensions: 800 x 800 x 1600 / Packed: W850mmxD850mmxH1750mm	EPO (Emergency Power Off)	Standard <1000m, Correction Factor 1. <2000m, Correction Factor >0.92, <3000m; Correction Factor >0.84	
Dimensions (WxDxH) (mm) Dimensions: 800 x 800 x 1600 / Packed: W850mmxD850mmxH1750mm	Isolation Transformer	Optional	
	Net Weight (kg)	220kg / Packed 240kg	
NOTE: CUSTOMIZED SOLUTIONS ARE POSSIBLE, PLEASE ASK FOR THE NEEDED SOLUTION / Customizable Connection Cables for Airplane	Dimensions (WxDxH) (mm)	Dimensions: 800 x 800 x 1600 / Packed: W850mmxD850mmxH1750mm	
	NOTE: CUSTOMIZED SOLUTIONS A	ARE POSSIBLE, PLEASE ASK FOR THE NEEDED SOLUTION / Customizable Connection Cables for Airplane	

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