400Hz STATIC FREQUENCY CONVERTER

Rev. 3 120 ÷ 315kVA FC400

Static frequency converters, ELIT FC series, are outcome of a long experience both in UPS and in frequency converters field. To complete our apparatus series for airfield applications, constant current regulators for lighting system and 28.5vdc feeder for the engine starter are available.
All of our equipments distinguish themselves by the employment of advanced technological components, excellent reliability and easy maintenance.
The simplicity of working is the main feature of all of our products.

PRINCIPLES OF WORKING

The benefit of a 400Hz electric system resides in lowered dimensions and weight respect an analogous system to 50Hz or 60Hz.
Benefits, these ones, very important on board of an aircraft where the space is always narrowed and it is a must minimize the weights and maximize the performances.
The FC400 static frequency converter allows to feed the aircraft on runway transforming the 50/60Hz mains voltage into a sinusoidal, stabilized and galvanic insulated 400Hz voltage.
The employ of the converter allows the electric system test, keeping OFF the aircraft's engines.
A diode rectifier transforms the AC voltage into a continuous stabilized DC link voltage, to power the IGBT inverter that transforms the continuous voltage into a 400Hz alternating sinusoidal stabilized voltage with a PWM modulation. The output inverter voltage feeds a transformer which on its output have the filter capacitors.
The output voltage is sinusoidal with a distortion of 3%. The output has an electronic stabilization both in voltage and in frequency.

FEATURES

- High efficiency > 93%;
- Filtered, stabilized and regulated sine wave supply;
- 400Hz ± 0.01% frequency accuracy;
- Input power factor > 0.95;
- Wide input voltage window and input frequency window:
- Superior overload capability;
- Insulation transformer;
- LCD display;
- Emergency Power Off.

OPTIONS

- Drop line compensation;
- Local aircraft interlock circuit with bypass;
- Remote control terminal board;
- No Break Power Transfer;
- Neutral conductor rupture supervision;
- Battery version (UPS);
- Protection degree IP 54;
- Horizontal or mobile version;
- Additional 28Vdc module output;
- RS232, USB, RS485 & SNMP interfaces.

CONTROL PANEL

The control panel is divided in three parts:
- LCD display (PMD)
- LED indicators
- Keyboard.

LCD display

LCD backlit. Display is subdivided into four menus which are accessible by pressing the relevant function keys:
- Voltage: phase voltage, active Energy, linked voltage, reactive voltage phase voltage min. value and max value, harmonic distortion phase voltage;
- Current: phase current, active energy, phase current demand, reactive energy, phase current max demand, neutral current, harmonic distortion phase current
- Power: Active, reactive, apparent power, phase active power, reactive energy, phase reactive power, phase apparent power, active, reactive apparent power demand and max demand;
- Power factor;
- Frequency ;
- Working hours and minutes;
- Positive and negative active Energy;
- Positive and negative reactive Energy;

LED signaling

- Mains;
- frequency converter running;
- frequency converter alarm.

Keyboard

Possibility to select the desired menu, to load a customized display page and modify the programmable parameters.

INTERFACES

The apparatus are provided with a dry contact to remote the following signaling:
- frequency converter alarm;
- frequency converter running;
- ON/OFF remote control

Optional modules:
- RS485 communication;
- RS232 communication;
- Profibus communication;
- Lonworks communication;
- Pulse output;
- Analog output;
- Alarms;
- Neutral current.

MONITORING CONTROL SYSTEM (as option)

ELITAVIO manages communication from and to remote devices, distributed in two ways:

- Physical connections;
- Wireless connections.

These two kinds of connections can be combined at any way, to use in the better way the available infrastructures for the application (telephone cable, ADSL/HDSL connections, optic fiber cable, GSM/GPRS modem, UMTS modem, HSPDA modem).

The System can use two dedicated lines by cable, optic fiber or it can use a point of access through LAN network or internet in remote plant allowing the management with automatic calling or through request of the control device.

The Workstation logs on Central System through LAN or Internet network allowing the complete compatibility of the System.

ELITAVIO has a Client platform, designed for mobile phones, with Java ELITMobile platform. It allows to access directly with the phone to

all data of the Server and to perform all maintenance actions in remote.

The Central System controls every access with login procedure, classifying them in different levels according the operative level that you desire to give at each user.

CUSTOM VERSION

We realize custom apparatus according to customer's technical data employing the standard series sets and therefore with experimented feature:

Fixed or variable input Voltage;
Fixed or variable output voltage;
Outdoor protection degree;
Extended temperature range -40°C to +50°C;
UPS version;
Parallel version;
Parallel cabinet with system switches;
Voltage fine regulation (potentiometer);
Frequency fine regulation (potentiometer);
Distribution cabinet;
Drop line compensator cabinet;
Mobile Version;
Under Bridge version;
Output 28Vdc voltage.

Model	FC400 120	FC400 150	FC400 180	FC400 200	FC400 220	FC400 270	FC400 315
Rated power kVA/kW	120/96	150/120	180/144	200/160	220/176	270/216	315/252

INPUT	
Nominal voltage	400V 3Ph (208, 480 and 575V as option)
Voltage tolerance	± 15%
Power factor	> 0.95 at nominal load
Nominal frequency	50Hz , 60Hz ±5%
Current distortion	<30% (<10% as option)
Inrush current	Absent

OUTPUT	
Voltage	200V 3Ph+N (115, 480 and 575V as option)
Frequency	400Hz ± 0.01%
Power factor	0.7 lagging to 0.95 leading
Waveform	Sinusoidal
Total harmonic distortion	<3% with linear load
Static stability	±1%
Dynamic stability	±8%
Recovery time	2 msec.
Overload	125% for 10 minutes, 150% for 1 minute
Voltage symmetry	±1% with balanced load, ±2% with 30% unbalanced load
Crest factor	1.414 ±3%

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MISCELLANEOUS							
Dimensions	120kVA	150kVA	180kVA	200KVA	220kVA	270kVA	315kVA
WxDxH	1200x600x1800mm			1500x950x1850mm			
Weight kgs	900	950	1300	1500	1800	22170	2250
Overall efficiency	> 93%						
Noise level	68dBA			70dBA			
Operating temperature	-25 ÷ +50°C						
Relative humidity	0 from 95% without condensing						
Altitude	1000m without derating						
Protection degree	IP20 (IP31, IP41 and IP54 on request)						
Cooling	Forced air						

STANDARDS	
Performance	ISO 6858, MIL-STD-704, EN 2282
EMC	EN 61000-6-4, EN62040-2, EN 61000-6-2, EN 61000-4-3/4/5
Safety	EN 62040-1-1, EN 61558-2-6

USER INTERFACE	
Input	Circuit breaker
Output	Switch (contactor on request)
Selector	ON/OFF
Output meter	Voltage, current, frequency (minimum and max voltage, current demand, max current demand, average current, current harmonic distortion, three phase power, phase power, power factor, run hour, active and reactive energy)
Signaling	Mains, converter running, converter alarm (output converter connected on request)
Potentiometers	Voltage fine regulation and frequency fine regulation on request
Remote control	ON/OFF converter

AVAILABLE OPTIONS	
	Additional output module 400Hz Additional output module 28Vdc till 800 A No Break Power Transfer (NBPT) Generative loads Remote Control Terminal Board Mobile or bridge mounted configuration Extended temperature range -40°C to 50°C UPS version with battery Parallel kit version Local aircraft interlock circuit Local and remote drop line compensation Neutral conductor rupture supervision