FCL H SERIES - SINGLE PHASE - 3 to 100 kVA

sinalda.com
mains voltage control

STATIC VARIABLE AC VOLTAGE & FREQUENCY CONVERTERS

AC SINGLE PHASE 3 TO 100 kVA

IGBT SOLID STATE PWM DESIGN

H SERIES MODELS

INPUT: 220V - 230V - 240V - 50 or 60Hz

OUTPUT: 0V to 300V - 40 to 70Hz

FCL H SERIES

220V / 230V / 240V - 2 WIRE

SINGLE PHASE

THE UNIVERSAL AC POWER SOURCE

IDEAL FOR USE IN TESTING CENTRES, RESEARCH LABS AND TESTING ON PRODUCTION LINES

FCL Series Single Phase Static Variable Voltage and Frequency Converters utilise the latest in solid state Pulse Width Modulated (PWM) Inverter and Rectifier technology, combined with Galvanic Isolation, to deliver a clean and regulated variable AC power supply - ideal for use in testing centres, research laboratories and for testing on production lines.

Sinalda FCL Series Variable AC Voltage & Frequency Converters offer -

- Ability to replicate all the numerous nominal utility mains single phase voltages (eg 100V to 277V) and civil Frequencies 40 to 70 Hz (40 to 499 Hz Special Build Option for Military, Avionic and Marine applications) deployed throughout the world
- Suitable for use with Resistive, Capacitive, Inductive and Non-Linear Loads
- Galvanically Isolated with Pure & Stable Sine Wave Output delivering minimal harmonic distortion (EMI/EMC)
- Selectable High or Low Current Output Voltage Ranges
- High Overload Capability
- PWM / IGBT design ensures High Efficiency and Low Noise whilst delivering Maximum Reliability
- Uncomplicated and simple to use set-up and operation
- Easy to read LED Digital Metering displaying Output Frequency, Voltage, Current and Loading - eliminating the need for external monitoring

TYPICAL APPLICATIONS

- **Test Laboratory & Research Centre**
- **Electrical & Electronic Equipment Testing**
- **Production & Process Control Systems**
- **Airport Grounding Equipment**
- **Military Diagnostic Systems**
- **Communication, Avionics & Marine Equipment**

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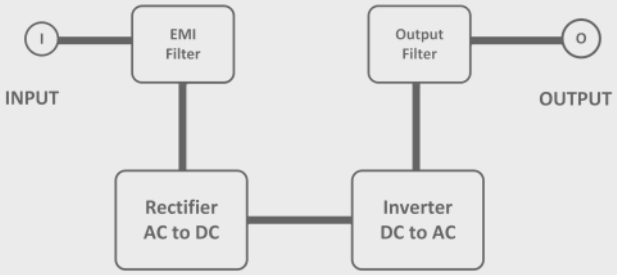
STATIC IGBT PWM DESIGN TOPOLOGY

A FCL Series Variable AC Voltage & Frequency Converter takes the electrical input power at one frequency and voltage and provides an adjustable output voltage and frequency - ideal for testing loads over their full voltage and frequency range.

By design the incoming AC Mains Utility supply is converted by a rectifier into DC. The DC is then feed into an Inverter which produces the required AC output power. The resulting stable and pure sinewave is then passed though a low distortion linear amplifier to achieve the required high power output rating. By utilising crystal oscillation the availability of enhanced frequency stability is ensured.

Solid State in basic design, the only moving parts are the fans used to force cool the system.



INPUT VOLTAGE CHOICES AVAILABLE

2 WIRE SOLUTIONS

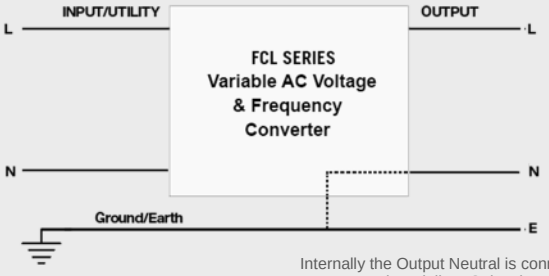
SINGLE PHASE WITH NEUTRAL (+ GROUND / EARTH)

H SERIES
3 to 100 kVA

High Voltage Models:
220V, 230V or 240V
Other voltages available on individual request / quotation.

L SERIES
3 to 50 kVA

Low Voltage Models:
110V, 115V, 120V or 127V
Other voltages available on individual request / quotation.



Internally the Output Neutral is connected to Earth to deliver Galvanic Isolation

INPUT & OUTPUT VOLTAGE & FREQUENCY SETTINGS

H SERIES

INPUT		OUTPUT					
Nominal Single Phase Input Voltage & Frequency	Input Voltage Window - S10	Available Output Voltages	Selectable High or Low Current Output Voltage Ranges		Output Voltage Accuracy ± % of Output	Programmable Output Frequency	Output Frequency Accuracy ± % of Output
220V 50 or 60Hz	198 to 242V (± 10%)	0V to 300V	High Level	151 to 300V	± 1%	40 to 70Hz *(40 to 499 Hz Special Option)*	± 0.01%
			Low Level	0 to 150V			
230V 50 or 60Hz	207 to 253V (± 10%)	0V to 300V	High Level	151 to 300V	± 1%	40 to 70Hz *(40 to 499 Hz Special Option)*	± 0.01%
			Low Level	0 to 150V			
240V 50 or 60Hz	216 to 264V (± 10%)	0V to 300V	High Level	151 to 300V	± 1%	40 to 70Hz *(40 to 499 Hz Special Option)*	± 0.01%
			Low Level	0 to 150V			

SOLID & ROBUST CONSTRUCTION

FCL Series Static Frequency Converters are enclosed in robust floor standing air-cooled cubicles, being built upon a rigid framework construction and offering front door access and removable side panels for ease of installation and servicing.

Supplied as standard with bottom cable entry (top entry to specific order), FCL Frequency Converters offer IP20 / NEMA 3 Style Ingress Protection and are supplied complete with an epoxy powder heavy duty RAL 7032 (Pebble Grey) orange peel paint finish.

Typical Internal View - 45 kVA Model

ALSO AVAILABLE IN IP54 / NEMA 3 STYLE ENCLOSURES

Suitable for external use, or more challenging internal environments.

IP 54 OPTION

NEMA 3 OPTION

Typical 6kVA IP54 Enclosure

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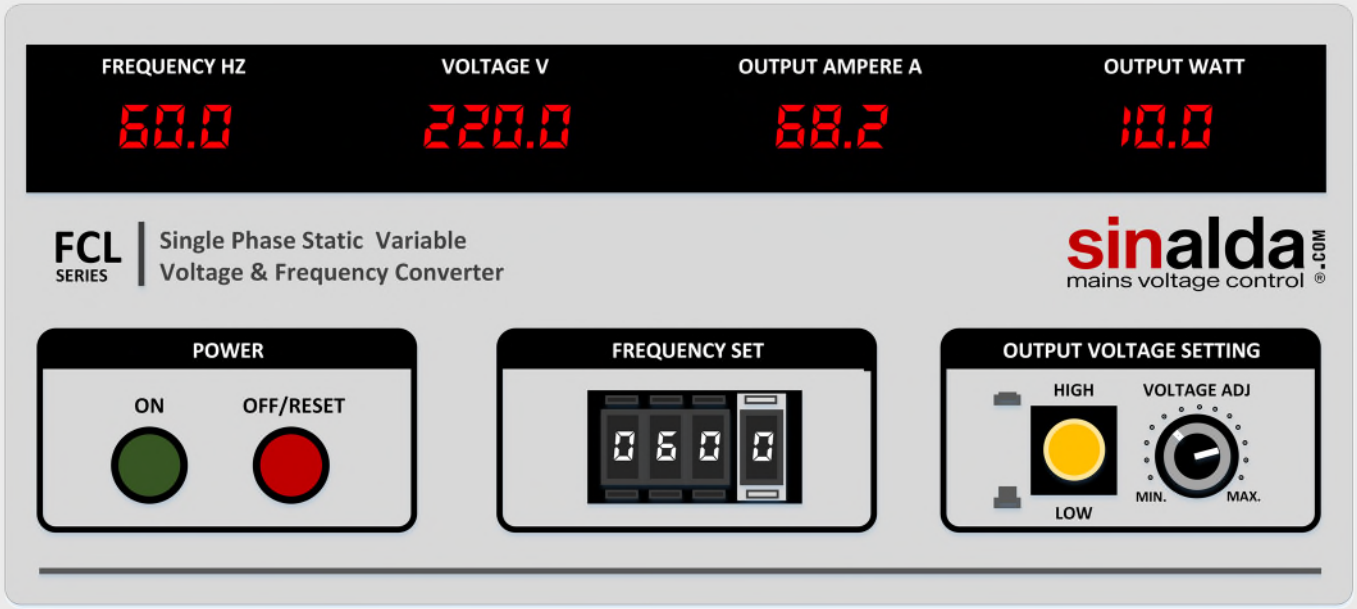
DIGITAL DISPLAY PANEL



PRODUCT SELECTION TABLE

Sinalda FCL Model No.	Power Rating @300V Output		Maximum Output Current Rating @40~70Hz		Physical Size & Weights	
	kVA	kW	High Level Setting 150 to 300V	Low Level Setting 0 to 150V	W x H x D mm	Kg
FCL-3H-S10	3	2.4	10 Amps	20 Amps	350 x 700 x 540	50
FCL-6H-S10	6	4.8	20 Amps	40 Amps	350 x 700 x 540	70
FCL-10H-S10	10	8	33 Amps	66 Amps	420 x 920 x 640	90
FCL-15H-S10	15	12	50 Amps	100 Amps	420 x 920 x 640	110
FCL-20H-S10	20	16	66 Amps	112 Amps	420 x 920 x 640	130
FCL-30H-S10	30	24	100 Amps	200 Amps	500 x 1100 x 770	160
FCL-45H-S10	45	36	150 Amps	300 Amps	650 x 1350 x 850	360
FCL-60H-S10	60	48	200 Amps	400 Amps	750 x 1200 x 850	400
FCL-75H-S10	75	60	250 Amps	500 Amps	860 x 1300 x 1050	430
FCL-80H-S10	80	64	266 Amps	532 Amps	860 x 1300 x 1050	450
FCL-100H-S10	100	80	333 Amps	666 Amps	860 x 1300 x 1050	530

ENSURING THE CORRECT SIZING

FCL Frequency Converters have both maximum kVA (Apparent Power) ratings and kW (Real Power) ratings – difference between the two being commonly referred to as the Power Factor.

In general, when sizing the Frequency Converter neither the kW nor kVA rating of a Frequency Converter should be exceeded.

Equipment nameplate ratings are often stated in kVA, which makes it difficult to know the kilo-watt ratings. If using equipment nameplate ratings for sizing, a user might configure a system, which appears to be correctly sized based on kVA ratings, but actually exceeds the Frequency Converters kW rating. By sizing the kVA rating of a load to be no greater than 60% of the kVA rating of the Converter, it minimises the risk of exceeding the watt rating of the Converter. Therefore, unless you have high certainty of the watt ratings of the loads, the safest approach, and widely considered to be the 'best practice', is to keep the sum of the load nameplate ratings below 60% of the converters kVA rating.

Where the load type is **inductive** in nature such as motors (fans, pumps, etc), solenoids, and relays it is essential that high inrush current and short-time overload factors are fully considered. With motors (without a soft start facility) typically drawing on start-up current 5 to 7 times the stated rating of the motor it is recommended that a Frequency Converter is selected that is 3 times the stated rated capacity of the load and that the inrush current does not exceed the listed "**Maximum Output Current Rating**" of the converter.

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TECHNICAL SPECIFICATION

General:

Phase	**Single Phase, 2 Wire** *(1P+Neutral+G/E)*
FCL Models	**FCL-3H-S10 to FCL-100H-S10**
Power Ratings	**11 Model Ratings-** **3kVA** (2.4kW), **6kVA** (4.8kW), **10kVA** (8kW), **15kVA** (12kW), **20kVA** (16kW), **30kVA** (24kW), **45kVA** (36kW), **60kVA** (48kW), **75kVA** (60kW), **80kVA** (64kW) & **100kVA** (80kW) *- Larger ratings to special order*
Design Topology	**Static - IGBT/ Pulse Width Modulated (PWM)**

Input:

Voltage	**220V - 230V - 240V ±10%**
Frequency	**47 to 63Hz ±5%**

Output:

Selectable High or Low Current Output Voltage Ranges		**High Voltage - 150 to 300V** **Low Voltage - 0 to 150V**
Voltage Regulation		**±1%**
Frequency		**40 to 70Hz** *(Programmable Key Lock Setting)* *(Extendable to 499 Hz as special build option)*
Frequency Stability		**±0.01%**
Power Factor		**0.8**
Digital Metering:	Frequency (Hz)	**4 Digit LED Digital Display - Resolution 0.1Hz/Step**
	Voltage (Volts)	**4 Digit LED Digital Display - Resolution 0.1 Volt**
	Current (Amps)	**4 Digit LED Digital Display - Resolution 0.1 Amp**
	Loading (kW)	**4 Digit LED Digital Display - Resolution 0.1 kW**

Protection Features:

As Standard	**Electronic Circuit/Circuit Breaker, Overload Warning, Over Temperature, Short Circuit, EPO & Auto-Power Off**

Environmental:

Operating Temperature Range	**Temperature range –15 to 45 °C. Derate by 2% for each additional °C Up to max 60 °C**
Maximum Altitude	**Maximum altitude 1000m. Derate by 2.5% for each additional 500m**
Relative Humidity	**Suitable for indoor tropical use 90% RH** *(non-condensing)*
Efficiency	**≥94%**
THD - Harmonic Distortion	**Pure Sinewave ≤2%**
Audible Noise	**60~120 dB at 1 meter** *(dependent on rating)*

Physical:

	Construction:	**Enclosures to IP20 (NEMA 1 Style) - BS EN 60529**
	Colour:	**RAL 7032** *(Pebble Grey - Epoxy Powder Coating)*
	Dimensions & Weights	**See Product Selection Table**

Certification & Conformance:

EMC Conformance	**Complies with BS EN 55022 and the relevant parts of the BS EN 61000 series of standards**
CE Certification	**CE Marked - being fully compliant with European Union Directives 2014/30/EU** *(The EMC Directive)* **and 2014/35/EU** *(The Low Voltage Directive)*

Warranty:

Standard Warranty	**2 Year / 24 Months from date of supply**
Extended Warranty	**Option - Extendable Warranty up to 60 Months / 5 Years**

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TYPICAL APPLICATIONS

Our **FCL Series** Variable Voltage and Frequency Converters are typically utilised in -

- Research & Design	● New product design brings certain challenges for manufacturers today as the world marketplace presents a wide variety of AC power forms. In addition to the many variations of power, the stability of that power may not always be consistent from one locality to another. ● Whether you want consistent precision power from day to day or need to simulate a wide variety of power line disturbances, Sinalda can work with you to define your AC power solution.
- Manufacturing Testing	● Often products are used at a different voltage and frequency from the country in which they are produced. This creates a need to convert both voltage and frequency on a production line. ● Sinalda products are used worldwide to supply the voltage and frequency needed by any given product requiring AC Power. Stable voltage and frequency are also required to minimize the rejection of a product due to poor power conditions in a factory. Our products provide a stable output while the input voltage or frequency may vary. This provides the assurance that a product did not fail due to a low-voltage line in your facility.
- Military	● From field use, to shipboard applications, to laboratory environments, Sinalda's military customers benefit from the high quality, rugged designs of its standard Variable AC Voltage and Frequency Converters. ● Our products can be found powering sensitive electronic equipment in a wide variety of military applications and environments.
- Avionics	● As aircraft electronics continue to evolve, so do their power requirements. ● At Sinalda we are able to replicate the environments required to test for compliance with aerospace test requirements. Varying frequency and voltage, we can provide a great amount of control and simulation of the AC power on an aircraft.

AVAILABILTY

We offer probably the best availability on AC Voltage Stabiliser & Power Conditioning solutions.

Many of our most popular ratings are readily available from stock at the factory or from one of our strategically located Service and Distribution Hubs.

Where a solution is not readily available, due to our considerable investment in component inventory and fine-tuned accredited build processes, we are able to ensure very short lead times on deliveries *– even for the largest of models!*

CUSTOM BUILT SOLUTIONS

Sinalda UK, with a strong and wide manufacturing base, is able to meet the requirements of customers from our own in-house professional resources.

Where bespoke / custom built solutions are required we are able to call upon our extensive portfolio of proven standard designs and tailor offerings to accommodate, without breaking the bank, most individual specific requirements.