

# FCP400-12G

## AC-DC Power Supply

### 12V Output, 400 W



#### Key Features & Benefits

- RoHS lead free solder
- Certified to efficiency 80plus platinum
- Wide input voltage range 90-264 VAC
- Two outputs (one high current output)
- Low conducted and radiated EMI
- (EN 55022 class B)
- Safety approved to the latest editions of the following standards: CSA/UL60950-1, EN60950-1 and IEC60950-1
- High density design
- 4" x 1.58" x 8.5" cassette
- Highly-efficient topology
- I<sup>2</sup>C interface
- Overtemperature, output overvoltage, and output overcurrent protection
- Supervisory signaling
- Included ORing FET for true redundant operation

The FCP400-12G is highly-efficient AC-DC power supply, with one high current output and an additional standby output, which can be used in a wide range of applications. Active current share along with internal ORing FET allow the FCP400's to be also used in redundant, hot-swap applications.

Model meet international safety standards and display the CE Mark for the low Voltage Directive.

#### Applications

- Telecommunication Equipment

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**Asia-Pacific**

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**Europe, Middle East**

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# FCP400-12G

## Model Selection

Model	Input Voltage VAC	Output 1		Output 2		Rated Power W
		$V_o$ nom VDC	$I_o$ max ADC	$V_o$ nom VDC	$I_o$ max ADC	
FCP400-12G*	90-264	12	33.3	12	0.7	408

\* Suffix "G" added to the part number means the product is RoHS compliant for all 6 substances

## Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings may cause performance degradation, adversely affect long-term reliability, and cause permanent damage to the converter.

PARAMETER	CONDITIONS / DESCRIPTION	MIN	MAX	UNITS
Input Voltage	Continuous		264	VAC
	Transient, 60 ms		300	VAC
Operating Temperature	Ambient	0	55	°C
	$V_{i \min}$ - $V_{i \max}$ , $I_o$ nom, cooling by internal fan			
Storage Temperature	Non-operational	-40	85	°C

## Input Specifications

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	CONDITIONS / DESCRIPTION	MIN	NOM	MAX	UNITS
Input Voltage		90	115/230	264	VAC
Turn-On Input Voltage	Ramping up	70	-	90	VAC
Turn-Off Input Voltage	Ramping down	70	-	90	VAC
Input Frequency		47	50/60	63	Hz
Inrush Current Limitation	115/230 VAC			20/27	A
Power Factor	$V_{i \text{ nom}}$ , $I_o$ nom	0.96			
Efficiency	$V_i = 230$ VAC, $I_o$ nom	90			%

## Output Specifications

All specifications apply over specified input voltage, output load, and temperature range unless otherwise noted.

PARAMETER	CONDITIONS / DESCRIPTION	MIN	NOM	MAX	UNITS
Output Voltage Setpoint Accuracy	$V_i = 230$ VAC, $I_{o1}$ @ 16.6 ADC, $T_c = 25$ °C	-0.01		0.01	VDC
Output Current V1		0	33.3	33.3	ADC
Output Current V2		0	0.7	0.7	ADC
Static Line Regulation V1	$V_{i \min}$ - $V_{i \max}$ , $V_{i \text{ nom}}$ , 0-100% $I_o$ nom	-0.06		0.06	VDC
Static Load Regulation V1 (Droop Characteristic)	$V_{i \min}$ - $V_{i \max}$ , $V_{i \text{ nom}}$ , 0-100% $I_o$ nom	-0.1		0.1	VDC
Hold-Up Time	Starting at $V_i = 230$ VAC, $P_o$ nom	20			ms
Dynamic Load Regulation	Load change 5A to 16A, 16A to 27A and back voltage deviation recovery time	-0.24		0.24	VDC
				400	µs
Start-Up Time	$V_{i \text{ nom}}$ , $I_o$ nom			1.5	s
Output Voltage Ripple and Noise	$V_{i \text{ nom}}$ , $I_o$ nom, 20 MHz bandwidth			120	mVpp

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## Protection

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	CONDITIONS / DESCRIPTION	MIN	NOM	MAX	UNITS
Input Fuse	Not user accessible		8A T		
Input Transient Protection	With varistor				
Output	No-load and short circuit proof short circuit proof overload (latch style)	110		130	% $I_{o\ nom}$
Overvoltage Protection	Latch type – disable output V1	115		130	% $V_{o\ nom}$
Overtemperature Protection	Automatic power shutdown at $T_A = 62\ ^\circ\text{C}$				

## Control

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	CONDITIONS / DESCRIPTION
I <sup>2</sup> C Digital Bus	Reports information and monitors alarm functions
PS Seated Signal	Contact closure to GND
PS Remote Shutdown	TTL compatible signal, open collector. Power supply enabled at Low or TTL "0" (e.g. by connecting of pin 22 to 0V or GND)
AC Fail Warning (I <sup>2</sup> C & OC)*	Supervisory AC input voltage;
DC fail (I <sup>2</sup> C & OC)*	Supervisory under- and overvoltage pre-ORing FET of V1
Temperature Warning (I <sup>2</sup> C & OC)*	Indicates if unit is operating normally or in overtemperature, Pre-warning time >10 ms
Fan Fail (I <sup>2</sup> C & OC)*	Indicates if fan speed is below 80% of the currently required level
Current Share	Active current share for V1 Droop load characteristic for V2
Status Indication	LEDs: DC OK (green), AC OK (green)

\* Signal provided by I<sup>2</sup>C interface or by open collector (OC)

## Environmental, Mechanical & Reliability Specifications

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	CONDITIONS / DESCRIPTION	MIN	NOM	MAX	UNITS
Operating Humidity	Relative humidity, non-condensing	10		90	%
Storage Humidity	Relative humidity, non-condensing	5		95	%
Shock	IEC/EN 60068-2-27, 11 ms			30	$g_n$
Sinusoidal Vibration	IEC/EN 60068-2-6				
	2-8 Hz		15		mil
	8-200 Hz		2		$g_n$
MTBF	200-500 Hz		4		$g_n$
	MIL-HDBK-217F Notice 2, $G_B$ , 25 °C	300			kh

## Isolation Specifications

The electric strength test is performed in the factory as routine test in accordance with EN50514, IEC/EN 60950, and UL 1950 and should not be repeated in the field. Bel Power Solutions will not honor any warranty claims resulting from electric strength field tests.

PARAMETER	CONDITIONS / DESCRIPTION	MIN	NOM	MAX	UNITS
Insulation Safety Rating	Input/Case		Basic		
	Input/Output		Reinforced		
	Output/Case		Functional		
Electric Strength Test Voltage	Input/Case	1.5			kVAC
	Input/Output	3.0			kVAC
	Output/Case	0.5			kVDC

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# FCP400-12G

## EMC Specifications

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	DESCRIPTION	CRITERION
Electrostatic Discharge	IEC/EN 61000-4-2, level 4 (contact/air)	8/15 kV, Criterion B
Electromagnetic Field	IEC/EN 61000-4-3, level 3	10 V/m, Criterion A
Electr. Fast Transients / Burst	IEC/EN 61000-4-4, level 3 (direct/capacitive)	2/1 kV, Criterion B
Surge	IEC/EN 61000-4-5, level 3 (L/L, L/C)	1/2 kV, Criterion B
Voltage Dips and Interruptions	IEC/EN 61000-4-11	<20 ms Criterion A >20 ms Criterion B
RF Conducted Immunity	IEC/EN 61000-4-6	10 VAC, AM 80%, 1 kHz, Criterion A
Emissions Radiated/Conducted	CISPR 22/EN 55022/EN 61204	Class A / Class B
Harmonics	IEC/EN 61000-3-2	Class B
Voltage Fluctuation and Flicker	IEC/EN 61000-3-3	Pass

## Features

All specifications apply over specified input voltage, output load, and temperature range, unless otherwise noted.

PARAMETER	CONDITIONS / DESCRIPTION
Fan speed control	18 fan speed levels depending on inlet temperature, AC voltage and load. Fan speed and temperature information available on I <sup>2</sup> C digital bus.
μC supply voltage in-/output (Pin 10)	If unit is operating: 5 to 11V is provided at pin 3. If unit is NOT operating, pin 3 is input from a parallel connected unit for μC supply.

## Efficiency Characteristics

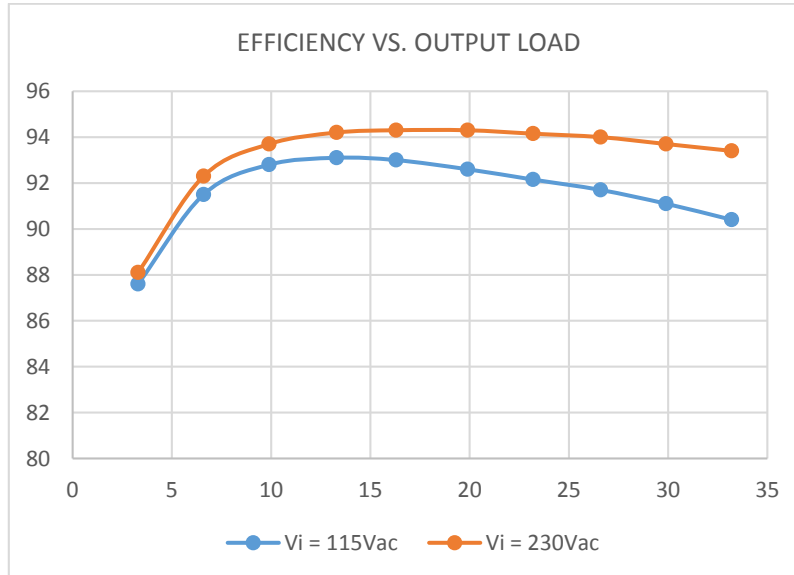


Figure 1 - Efficiency vs. Output Load

## Mechanical Specifications

PARAMETER	CONDITIONS / DESCRIPTION
Mechanical Dimensions (H x W x D)	4" (101.6 mm) x 1.58" (40.1 mm) x 8.5" (215.9 mm)
Weight	2.866 lb (1.3 kg)

# FCP400-12G

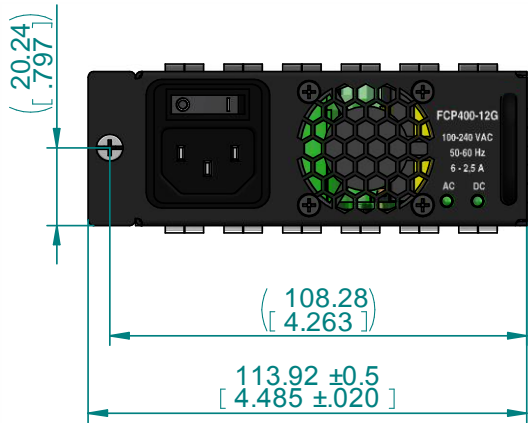


Figure 2 – Mechanical Drawing (Front View)

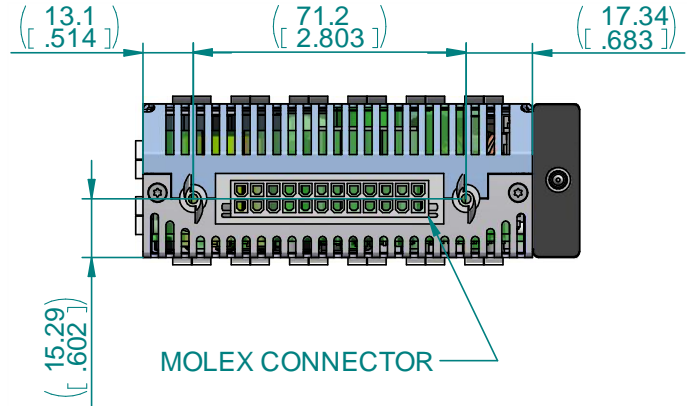


Figure 3 – Mechanical Drawing (Rear View)

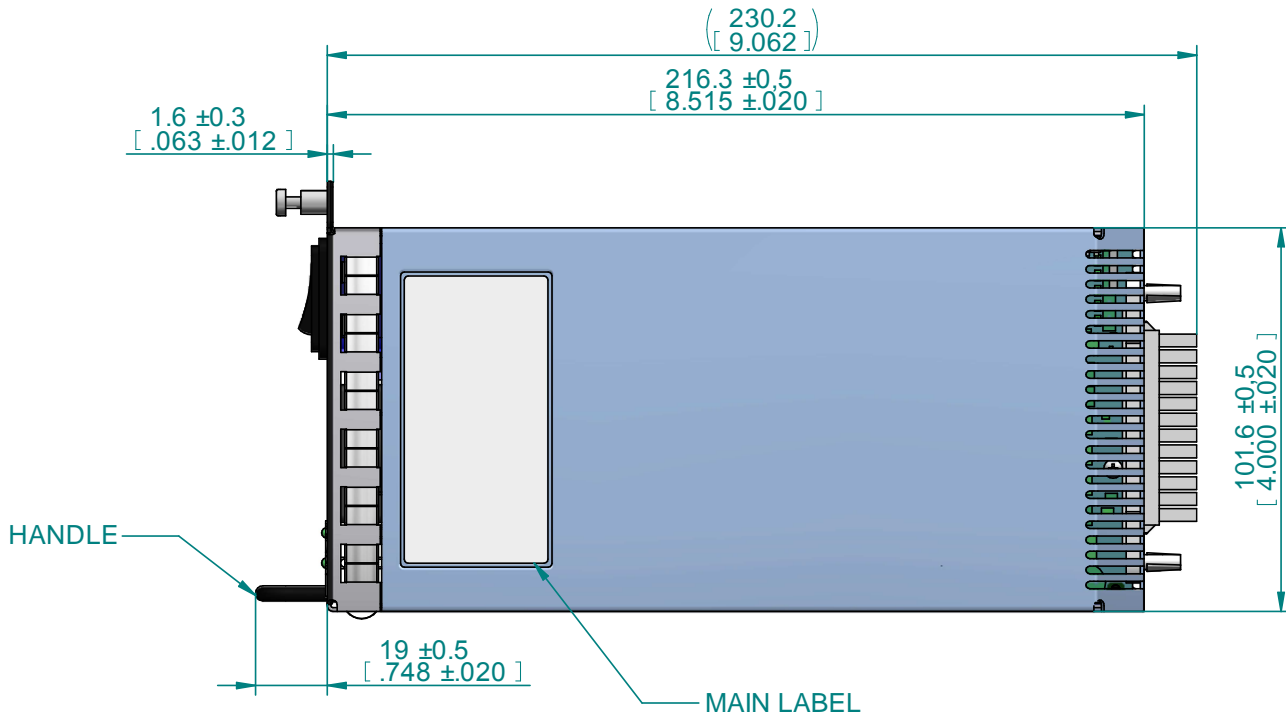


Figure 4 – Mechanical Drawing (Top View)

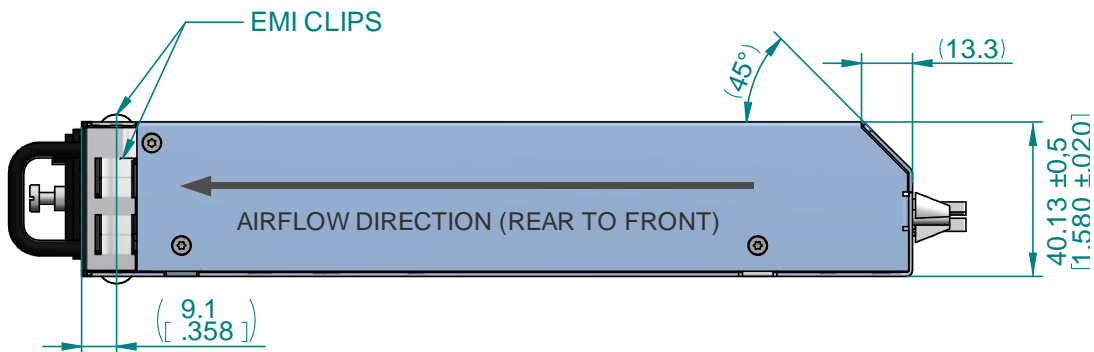


Figure 5 – Mechanical Drawing (Side View)

# FCP400-12G

## Output Connector Description

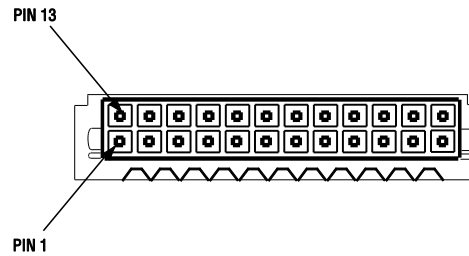


Figure 6 – Molex Connector (39-00-0046)

OUTPUT CONNECTOR DESCRIPTION	PIN LOCATION	REFERENCE NAME
12 V Output	4,5,6,16,17,18	Vo1
12 V Output RTN	1,2,3,13,14,15	Vo1 RTN
AC-fail, DC-fail, Temp.-fail	9	PS_FAIL
Power Supply Present Signal	23	PS_PRSNT_L
Serial Data Line	11	SDA
Serial Clock Line	12	SCL
Address Input Line A0	21	AO
Address Input Line A1	20	A1
5 to 11 V	10	µC supply voltage bus
FAN OK	24	FAN_FAIL
PS Remote Shut Down	22	PS_RSD_H
12 V Standby RTN	7	Vo2 RTN / Logic Ground / 5 to 11 V RTN
12 V Standby	19	Vo2
Active Current share	8	ACS

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