

3W

DC-DC
converters 

The 3W JHL03 series is designed for medical applications with 2 x MOPP 4kVAC reinforced isolation and 2µA patient leakage current, it is housed in a DIP24 PCB mount plastic case.

Featuring a 1.5:1 input voltage range of 10 to 17VDC or 20 to 30VDC with regulated single outputs of 5, 12 & 15VDC, dual outputs ± 12 & ± 15 VDC, adjustable $\pm 10\%$ with a trim resistor.

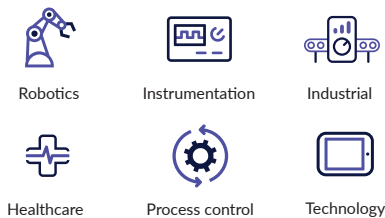
Remote on/off is standard as are short circuit, overload & over voltage protection. Operating temperature range is from -20°C to +80°C, with derating above +60°C.



Features

- ▶ Regulated single & dual outputs
- ▶ 1.5:1 input range
- ▶ Single outputs 5.0 to 15VDC
- ▶ Dual outputs ± 12 & ± 15 VDC
- ▶ DIP24 package
- ▶ International medical safety approvals
- ▶ 4.0kVAC reinforced isolation
- ▶ 2 x MOPP at 250VAC
- ▶ 2µA patient leakage current
- ▶ EN55011 Class A with no external components
- ▶ -20°C to +80°C operating temperature
- ▶ Full power to +60°C
- ▶ 3 year warranty

Applications



Dimensions

31.75 x 20.32 x 10.20mm (1.25" x 0.80" x 0.40")

Documentation

For further information click the link or scan the code

→ xppower.com



Models & ratings

Model number	Input voltage	Output voltage	Output current	Input current ⁽¹⁾		Maximum capacitive load ⁽²⁾	Efficiency ⁽³⁾
				No load	Full load		
JHL0312S05	10-17VDC	5.0VDC	600mA	56mA	325mA	720µF	76%
JHL0312S12		12.0VDC	250mA	72mA	316mA	300µF	78%
JHL0312S15		15.0VDC	200mA	67mA	315mA	240µF	78%
JHL0312D12		± 12.0 VDC	± 125 mA	43mA	304mA	± 140 µF	81%
JHL0312D15		± 15.0 VDC	± 100 mA	56mA	303mA	± 120 µF	80%

Continued on page 2

Notes:

1. Input current measured at nominal input voltage.
2. Maximum capacitive load is per output.

3. Typical values.

Models & ratings

Model number	Input voltage	Output voltage	Output current	Input current ⁽¹⁾		Maximum capacitive load ⁽²⁾	Efficiency ⁽³⁾
				No load	Full load		
JHL0324S05	20-30VDC	5.0VDC	600mA	38mA	167mA	720μF	74%
JHL0324S12		12.0VDC	250mA	37mA	165mA	300μF	78%
JHL0324S15		15.0VDC	200mA	23mA	146mA	240μF	82%
JHL0324D12		±12.0VDC	±125mA	29mA	150mA	±140μF	80%
JHL0324D15		±15V.0DC	±100mA	42mA	166mA	±120μF	80%

Notes:

1. Input current measured at nominal input voltage.

2. Maximum capacitive load is per output.

3. Typical values.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	10		17	VDC	12VDC nominal
	20		30		24VDC nominal
Input current	See models and ratings table				
Inrush current			25	A	At 30VDC input
Input filter	Pi type				
Patient leakage current			2	μA	
Undervoltage lockout	On at >9.0VDC, Off <8.6VDC				12VDC models
	On at >17.5VDC, Off <17.2VDC				24VDC models
Input surge			25	VDC	12VDC models for 3s
			50		24VDC models for 3s

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	5		30	VDC	See models and ratings table
Output voltage trim			±10	%	Via external resistors, see application notes
Initial set accuracy			±1	%	on V1
			±2		on V2 of dual output models
Minimum load	No minimum load required				
Start up delay			18	ms	
Start up rise time			15	ms	
Line regulation			±0.3	%	
Load regulation			±1	%	0 to 100% load
Cross regulation			±4	%	On dual output models with one output set to 50% load and the other varied from 10% to 100% load (D05 20% to 100%)
Transient response			4	% deviation	Recovery to within 1% in <500μs for a 50% load change at 0.25A/μs rate
Ripple & noise			1	% pk-pk	20MHz bandwidth
Short circuit protection	Trip & restart (hiccup mode), auto recovery				
Overload protection	120		200	%	Trip & restart (hiccup mode)
Overvoltage protection	115		140	%	
Temperature coefficient			0.03	%/°C	

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency		80		%	See models and ratings table
Isolation	4000			VAC	For 1 min. Double/reinforced with a working voltage of 250VAC. Meets 2 x MOPP per 3rd edition of IEC60601-1 5000VAC for 10ms in accordance with IEC60664-1
Patient leakage current			2	μA	
Input to output capacitance			20	pF	
Switching frequency		250		kHz	
Power density			0.4 (7.5)	W/cm ³ (W/in ³)	
Mean time between failure		>1		Mhrs	MIL-HDBK-217F, +25°C GB
Weight		20.0 (0.04)		g (lb)	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-20		+80	°C	See derating curve for input >10.5VDC input. At 10VDC input, min temp is -10°C
Storage temperature	-40		+100	°C	
Case temperature			+100	°C	
Humidity	5		90	%RH	Non-condensing
Cooling	Natural convection				
Shock	±3 shocks in each plane, total 18 shocks of 30g : 11ms halfsine. Conforms to EN60068-2-27 & EN60068-2-47				
Vibration	10-500Hz at 2g sweep and endurance at resonance in all 3 planes. Conforms to EN60068-2-6				

Safety approvals

Certification	Standard	Notes & conditions
CB	IEC60601-1 Including Risk Management	Medical
UL	ANSI/AAMI ES60601-1 3rd Ed. & CSA C22.2, No.60601-1:2008	Medical
EN	EN60601-1	Medical
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Emissions - EMC

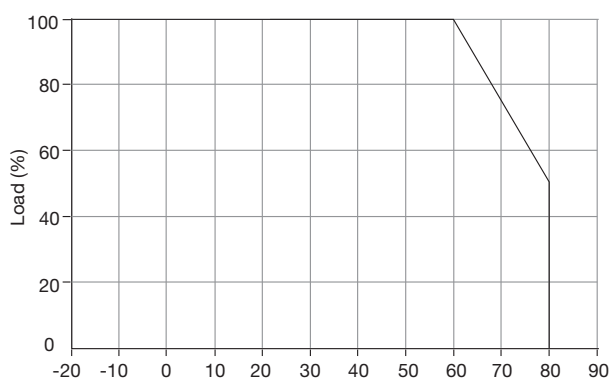
Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55011	Level A	
Radiated	EN55011	Level A	

Immunity - EMC

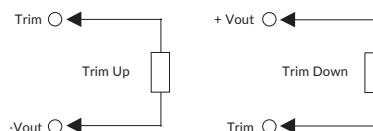
Phenomenon	Standard	Test level	Criteria	Notes & conditions
Immunity	IEC60601-1-2	Ed 4.0: 2014	As below	
ESD immunity	EN61000-4-2	$\pm 8\text{kv}$ Contact, $\pm 15\text{kv}$ Air	A	
Radiated immunity	EN61000-4-3	10Vrms	A	80MHz - 2.7GHz plus discrete communication proximity field frequencies
EFT/Burst	EN61000-4-4	2	A	
Surge	EN61000-4-5	1	A	
Conducted immunity	EN61000-4-6	3Vrms	A	
Magnetic fields	EN61000-4-8	30A/m	A	

Application notes

Derating curve



External output trim



For 5VDC output:

Trim +10%, R = 3.4k Ω typical
Trim -10%, R = 1.1k Ω typical

For $\pm 12\text{VDC}$ output

Trim +10%, R = 12.8k Ω typical
Trim -10%, R = 9.5k Ω typical

For 12VDC output

Trim +10%, R = 5.9k Ω typical
Trim -10%, R = 11.3k Ω typical

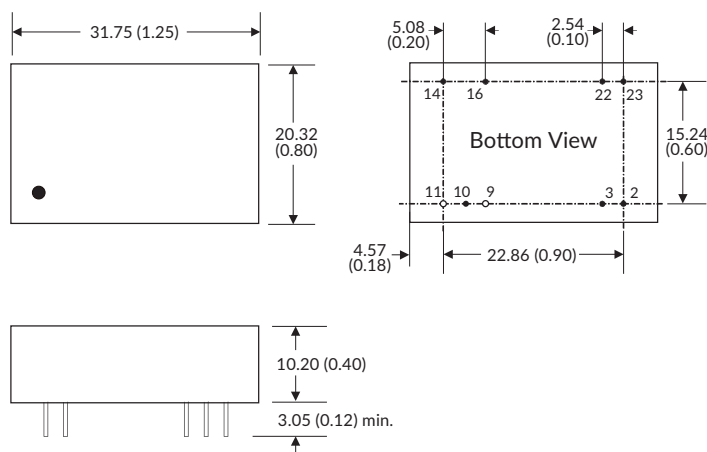
For $\pm 15\text{VDC}$ output

Trim +10%, R = 18k Ω typical
Trim -10%, R = 14.8k Ω typical

For 15VDC output

Trim +10%, R = 8.4k Ω typical
Trim -10%, R = 10.4k Ω typical

Mechanical details



Pin number	Single	Dual
2	-Vin	-Vin
3	-Vin	-Vin
9	No Pin	Common
10	Trim	Trim
11	No Pin	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin	+Vin
23	+Vin	+Vin

Notes:

- All dimensions in mm (inches).
- Weight: 20g (0.04lbs)

- Pin diameter: 0.5 $\pm$ 0.05 (0.02 $\pm$ 0.002)
- Pin pitch tolerance: $\pm$ 0.35 ($\pm$ 0.014)
- Case tolerance: $\pm$ 0.5 ($\pm$ 0.02)