

## JCB Series



- 2:1 Input Range
- Operating Temperature  $-40\text{ }^{\circ}\text{C}$  to  $+100\text{ }^{\circ}\text{C}$
- Single & Dual Outputs
- 1500 VDC Isolation
- Optional Isolation to 3000 VDC
- Optional Metal Case
- 3 Year Warranty

## Specification

## Input

Input Voltage Range	<ul style="list-style-type: none"> <li>• 5 V (4.5-9 VDC)</li> <li>• 12 V (9-18 VDC)</li> <li>• 24 V (18-36 VDC)</li> <li>• 48 V (36-72 VDC)</li> </ul>
Input Current	<ul style="list-style-type: none"> <li>• See table</li> </ul>
Input Filter	<ul style="list-style-type: none"> <li>• Pi network</li> </ul>
Input Reflected Ripple	<ul style="list-style-type: none"> <li>• 35 mA pk-pk through 12 <math>\mu\text{H}</math> inductor</li> </ul>
Input Surge	<ul style="list-style-type: none"> <li>• 5 V models 15 VDC for 100 ms</li> <li>• 12 V models 24 VDC for 100 ms</li> <li>• 24 V models 40 VDC for 100 ms</li> <li>• 48 V models 80 VDC for 100 ms</li> </ul>
Undervoltage Lockout	<ul style="list-style-type: none"> <li>• None</li> </ul>
Reverse Voltage Protection	<ul style="list-style-type: none"> <li>• None</li> </ul>

## Output

Output Voltage	<ul style="list-style-type: none"> <li>• See table</li> </ul>
Minimum Load	<ul style="list-style-type: none"> <li>• Minimum load required (see note 1)</li> </ul>
Initial Set Accuracy	<ul style="list-style-type: none"> <li>• <math>\pm 1\%</math> max</li> </ul>
Line Regulation	<ul style="list-style-type: none"> <li>• <math>\pm 0.5\%</math> max</li> </ul>
Load Regulation	<ul style="list-style-type: none"> <li>• <math>\pm 0.5\%</math> max</li> </ul>
Cross Regulation	<ul style="list-style-type: none"> <li>• <math>\pm 5\%</math> on dual output models (see note 2)</li> </ul>
Transient Response	<ul style="list-style-type: none"> <li>• <math>&lt; 3\%</math> deviation, recovery to within 1% in 2 ms for a 50% load change</li> </ul>
Ripple & Noise	<ul style="list-style-type: none"> <li>• 60 mV pk-pk max, 20 MHz bandwidth</li> </ul>
Short Circuit Protection	<ul style="list-style-type: none"> <li>• Continuous, with auto recovery</li> </ul>
Overshoot Protection	<ul style="list-style-type: none"> <li>• None</li> </ul>
Overcurrent Protection	<ul style="list-style-type: none"> <li>• None</li> </ul>
Maximum Capacitive Load	<ul style="list-style-type: none"> <li>• See tables</li> </ul>
Temperature Coefficient	<ul style="list-style-type: none"> <li>• <math>\pm 0.02/^{\circ}\text{C}</math> max</li> </ul>

## General

Efficiency	<ul style="list-style-type: none"> <li>• See tables</li> </ul>
Isolation Voltage	<ul style="list-style-type: none"> <li>• 1500 VDC Input to Output</li> <li>• For optional high isolation version 3000 VDC (see note 3)</li> <li>• 1500 VDC Input to Case</li> <li>• 1500 VDC Output to Case</li> </ul>
Switching Frequency	<ul style="list-style-type: none"> <li>• 100-400 kHz variable</li> </ul>
Isolation Resistance	<ul style="list-style-type: none"> <li>• <math>10^9\ \Omega</math></li> </ul>
Power Density	<ul style="list-style-type: none"> <li>• <math>7.5\ \text{W}/\text{in}^3</math></li> </ul>
MTBF	<ul style="list-style-type: none"> <li>• <math>&gt; 2</math> Mhrs to MIL-HDBK-217F at <math>25\text{ }^{\circ}\text{C}</math>, GB</li> </ul>

## Environmental

Operating Temperature	<ul style="list-style-type: none"> <li>• <math>-40\text{ }^{\circ}\text{C}</math> to <math>+100\text{ }^{\circ}\text{C}</math>, derate from 100% load at <math>+85\text{ }^{\circ}\text{C}</math> to no load at <math>+100\text{ }^{\circ}\text{C}</math></li> </ul>
Case Temperature	<ul style="list-style-type: none"> <li>• <math>+100\text{ }^{\circ}\text{C}</math> max</li> </ul>
Storage Temperature	<ul style="list-style-type: none"> <li>• <math>-40\text{ }^{\circ}\text{C}</math> to <math>+125\text{ }^{\circ}\text{C}</math></li> </ul>
Humidity	<ul style="list-style-type: none"> <li>• Up to 95% RH, non-condensing</li> </ul>
Cooling	<ul style="list-style-type: none"> <li>• Natural convection</li> </ul>

## EMC &amp; Safety

Emissions	<ul style="list-style-type: none"> <li>• EN55022 Class A conducted &amp; radiated, with external components, see application note</li> </ul>
ESD Immunity	<ul style="list-style-type: none"> <li>• EN61000-4-2, level 3, Perf Criteria A</li> </ul>
EFT/Burst	<ul style="list-style-type: none"> <li>• EN61000-4-4, level 3, Perf Criteria A (see note 7)</li> </ul>
Surge	<ul style="list-style-type: none"> <li>• EN61000-4-5, installation class 3, Perf Criteria A (see note 7)</li> </ul>
Conducted Immunity	<ul style="list-style-type: none"> <li>• EN61000-4-6, 10 V rms, Perf Criteria A</li> </ul>
Magnetic Fields	<ul style="list-style-type: none"> <li>• EN61000-4-8, 1 A/m, Perf Criteria A</li> </ul>

## Models and Ratings

Input Voltage	Output Voltage	Output Current	Input Current <sup>(6)</sup>		Maximum Capacitive Load	Efficiency	Model Number <sup>(3,4,5)</sup>
			No Load	Full Load			
4.5-9 V	5.0 V	600 mA	40 mA	857 mA	2200 µF	70%	JCB0305S05†^
	9.0 V	333 mA	40 mA	833 mA	470 µF	72%	JCB0305S09†^
	12.0 V	250 mA	40 mA	810 mA	470 µF	74%	JCB0305S12†^
	15.0 V	200 mA	40 mA	810 mA	470 µF	74%	JCB0305S15†^
	24.0 V	125 mA	40 mA	857 mA	220 µF	70%	JCB0305S24†^
	±5.0 V	±300 mA	40 mA	869 mA	±1000 µF	69%	JCB0305D05†^
	±9.0 V	±167 mA	40 mA	857 mA	±220 µF	70%	JCB0305D09†^
	±12.0 V	±125 mA	40 mA	833 mA	±220 µF	72%	JCB0305D12†^
	±15.0 V	±100 mA	40 mA	810 mA	±220 µF	74%	JCB0305D15†^
	±24.0 V	±63 mA	40 mA	857 mA	±100 µF	70%	JCB0305D24†^
9-18 V	5.0 V	600 mA	20 mA	328 mA	2200 µF	76%	JCB0312S05†^
	9.0 V	333 mA	20 mA	324 mA	470 µF	77%	JCB0312S09†^
	12.0 V	250 mA	20 mA	316 mA	470 µF	79%	JCB0312S12†^
	15.0 V	200 mA	20 mA	316 mA	470 µF	79%	JCB0312S15†^
	24.0 V	125 mA	20 mA	316 mA	220 µF	79%	JCB0312S24†^
	±5.0 V	±300 mA	20 mA	324 mA	±1000 µF	77%	JCB0312D05†^
	±9.0 V	±167 mA	20 mA	320 mA	±220 µF	78%	JCB0312D09†^
	±12.0 V	±125 mA	20 mA	320 mA	±220 µF	78%	JCB0312D12†^
	±15.0 V	±100 mA	20 mA	320 mA	±220 µF	78%	JCB0312D15†^
	±24.0 V	±63 mA	20 mA	320 mA	±100 µF	78%	JCB0312D24†^
18-36 V	5.0 V	600 mA	12 mA	156 mA	2200 µF	80%	JCB0324S05†^
	9.0 V	333 mA	12 mA	156 mA	470 µF	80%	JCB0324S09†^
	12.0 V	250 mA	12 mA	152 mA	470 µF	82%	JCB0324S12†^
	15.0 V	200 mA	12 mA	152 mA	470 µF	82%	JCB0324S15†^
	24.0 V	125 mA	12 mA	156 mA	220 µF	80%	JCB0324S24†^
	±5.0 V	±300 mA	12 mA	160 mA	±1000 µF	78%	JCB0324D05†^
	±9.0 V	±167 mA	12 mA	158 mA	±220 µF	79%	JCB0324D09†^
	±12.0 V	±125 mA	12 mA	156 mA	±220 µF	80%	JCB0324D12†^
	±15.0 V	±100 mA	12 mA	156 mA	±220 µF	80%	JCB0324D15†^
	±24.0 V	±63 mA	12 mA	156 mA	±100 µF	80%	JCB0324D24†^
36-72 V	5.0 V	600 mA	8 mA	81 mA	2200 µF	77%	JCB0348S05†^
	9.0 V	333 mA	8 mA	80 mA	470 µF	78%	JCB0348S09†^
	12.0 V	250 mA	8 mA	78 mA	470 µF	80%	JCB0348S12†^
	15.0 V	200 mA	8 mA	78 mA	470 µF	80%	JCB0348S15†^
	24.0 V	125 mA	8 mA	78 mA	220 µF	80%	JCB0348S24†^
	±5.0 V	±300 mA	8 mA	80 mA	±1000 µF	78%	JCB0348D05†^
	±9.0 V	±167 mA	8 mA	79 mA	±220 µF	79%	JCB0348D09†^
	±12.0 V	±125 mA	8 mA	78 mA	±220 µF	80%	JCB0348D12†^
	±15.0 V	±100 mA	8 mA	78 mA	±220 µF	80%	JCB0348D15†^
	±24.0 V	±63 mA	8 mA	78 mA	±100 µF	80%	JCB0348D24†^

### Notes

1. Minimum load required to meet noise and ripple and initial set accuracy specifications. Below 25% load, noise and ripple increases to 200 mV pk-pk typical and load regulation to ±1% max.
2. Cross regulation is ±5% when one output is at 100% the other is varied between 25% and 100%.
3. For optional 3000 VDC isolation, add suffix '-H' to end of part number.

† Available from Farnell & element14. See pages 284-290.

4. For optional metal case version, add suffix '-M' to end of part number, eg. JCB0324S12-HM

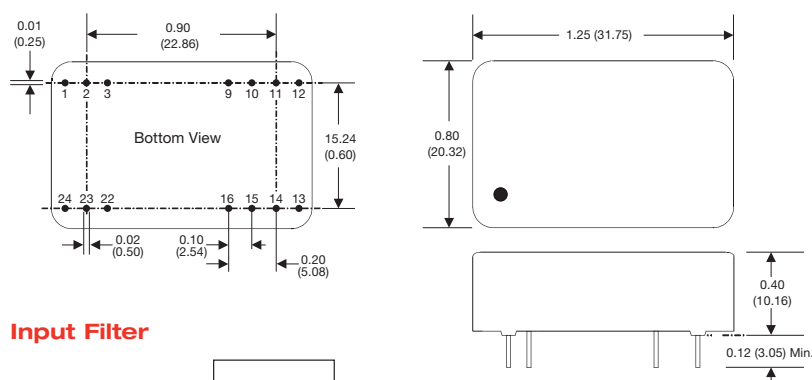
5. For alternative pin out, add suffix '-Z' to end of part number, eg. JCB0324S12-HMZ

6. Input current measured at nominal input voltage

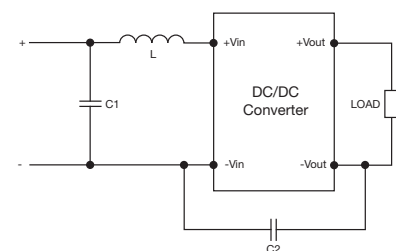
7. A 220 µF/100 V capacitor across the input is required in order to meet EN61000-4-4 & EN61000-4-5.

^ Available from Newark. See pages 291-296

## Mechanical Details and Application Notes



### Input Filter



Model	C1	L	C3
JCB0305	220 µF/100 V	12 µH	
JCB0312	220 µF/100 V	12 µH	
JCB0324	220 µF/100 V	12 µH	MLCC 471K
JCB0348	220 µF/100 V	12 µH	MLCC 471K

PIN CONNECTIONS						
Pin	Single	Dual	Single-H	Dual-H	Single-Z, or -HZ	Dual-Z, or -HZ
1	+Vin	+Vin	N.P.	N.P.	N.P.	N.P.
2	N.C.	-Vout	-Vin	-Vin	-Vin	-Vin
3	N.C.	Common	-Vin	-Vin	-Vin	-Vin
9	N.P.	N.P.	N.P.	Common	N.P.	Common
10	-Vout	Common	N.P.	N.P.	N.P.	N.P.
11	+Vout	+Vout	N.C.	-Vout	N.C.	-Vout
12	-Vin	-Vin	N.P.	N.P.	N.P.	N.P.
13	-Vin	-Vin	N.P.	N.P.	N.P.	N.P.
14	+Vout	+Vout	+Vout	+Vout	+Vout	+Vout
15	-Vout	Common	N.P.	N.P.	N.P.	N.P.
16	N.P.	N.P.	-Vout	Common	-Vout	Common
22	N.C.	Common	+Vin	+Vin	+Vin	+Vout
23	N.C.	-Vout	+Vin	+Vin	+Vin	+Vout
24	+Vin	+Vin	N.P.	N.P.	N.P.	N.P.

N.C. - No Connection

N.P. - No Pin

### Notes

1. All dimensions are in inches (mm)
2. Weight: 0.04 lbs (20 g) approx.
3. Pin diameter: 0.02±0.002 (0.5±0.05)
4. Pin pitch tolerance: ±0.014 (±0.35)
5. Case tolerance: ±0.02 (±0.5)