



FEW-B30E SERIES

30W 8:1 DC-DC Converter



FEW-B30E



FEW-B30EST



FEATURES

- DIP 2"x 1" package with standard pinout
- 8:1 wide input range
- High efficiency up to 88%
- Built-in remote on/off control
- Overload protection
- Built-in trimming output
- Short circuit protection
- Input and output over voltage protections
- ST and HSST models adding additional input reverse polarity protection

APPLICATIONS

- Automation equipment
- Power supplies
- Industrial PC
- Data communications
- Distributed power system

DESCRIPTION

FEW-B30E series is a 30W DC-DC converter products with 2"x1" standard industrial package.

It features wide 8:1 input voltage range, high efficiency up to 88%, 3000Vdc isolation, continuous mode short circuit, and various protections such as overload, input under voltage, input and output over voltage. The models meet radiated Class A of EN55032 without external components, and suits for all kinds of systems like industrial control, automation field, and so on.

MODEL ENCODING

<u>FEW</u>	<u>S</u>	-	<u>24</u>	<u>05</u>	<u>B</u>	<u>30</u>	<u>E</u>	<u>HS</u>	<u>ST</u>
Series Name	Output Quantity		Input Voltage	Output Voltage	Package	Power	Input Range	Option	
	S : Single		24 : 9~75V	03.3 : 3.3V			E : 8:1	Heat	Screw
	D : Dual			05 : 5V				Sink	Terminal
				12 : 12V; ±12V					
				15 : 15V; ±15V					
				24 : 24V;					

■ MODEL SELECTION TABLE

MODEL NUMBER	INPUT				OUTPUT		EFF. (%)	CAPACITOR LOAD (Max.)
	VOLTAGE (VDC)		CURRENT (mA)		VOLTAGE (VDC)	CURRENT (mA)		
	NOMINAL	RANGE	NO LOAD	FULL LOAD				
FEWS-2403.3B30E			15	1119	3.3	0~7000	86	680uF
FEWS-2405B30E			15	1437	5	0~6000	87	680uF
FEWS-2412B30E	24	9~75	15	1420	12	0~2500	88	330uF
FEWS-2415B30E			15	1420	15	0~2000	88	220uF
FEWS-2424B30E			15	1420	24	0~1250	88	100uF
FEWD-2412B30E	24	9~75	15	1420	±12	±0~1250	88	±150uF
FEWD-2415B30E			15	1420	±15	±0~1000	88	±100uF

Note:

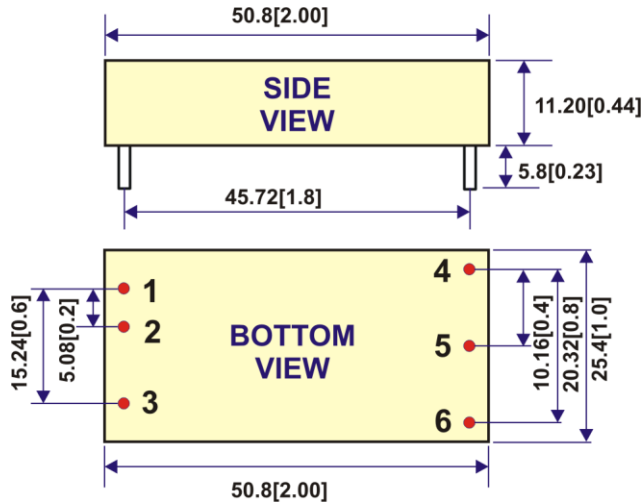
1. Efficiency and input current are measured at nominal input voltage and full load.
2. Other input to output voltages may be available. Please contact factory.
3. The minimum input voltage and starting voltage of ST and HSST models are 1VDC higher than those of DIP package due to input reverse polarity protection function.
4. Efficiencies for ST and HSST models are decreased by 2.5% due to the input reversepolarity protection circuit.

SPECIFICATION

INPUT	Voltage Range		9~75V		
	Surge Voltage(100ms max.)		9-75 Vin models : 100Vdc		
	Filter		Pi network		
	Protection		Fuse recommended (see page 8)		
	Remote Control		(see page 5)		
	Under Voltage Lockout		Start-up voltage : 8.8 Vdc Shutdown voltage : 7.5 Vdc		
OUTPUT	Voltage Accuracy		±2% max.		
	Rated Power		30W		
	Ripple & Noise ¹		150mVp-p max.	24V : 1% output Vp-p max.	
	Line Regulation ²		±0.5%		
	Load Regulation ³		±0.5% for other output	±1% for 3.3Vdc output	
	Cross Regulation		±5%	Dual : asymmetrical load 25%/100% FL	
	Switching Frequency		200KHz typ.(PWM)		
	External Trim ADJ.Range		±10%(typ.)		
PROTECTION	Short Circuit		Protection type : continuous, recovery		
	Overload		110%~190% Protection type : recovers automatically after fault condition is removed		
	Over Voltage	Input	Protection: shutdown output voltage (see page 6)		
		Output	(Clamp by TVS diodes)		
ENVIRONMENT	Cooling		Free-air convection		
	Working Temperature		-40~ +100°C (refer to “Derating Curve”)		
	Case Temperature		+110 °C max.		
	Working Humidity		5% ~ 95% RH non-condensing		
	Storage Temp., Humidity		-55 ~ +125°C, 10 ~ 95% RH non-condensing		
	Temperature Coefficient		±0.05% / °C		
	Soldering Temperature		1.5mm from case of 3~5 sec./265°C(max.)		
	Vibration		10~500Hz, 2G 10min./1cycle, period for 60 min. each along X, Y, Z axes		
SAFETY & EMC	Isolation Voltage		I/P-O/P : 3KVdc		
	Isolation Resistance		I/P-O/P : 1000M Ohms / 500VDC / 25°C / 70% RH		
	Isolation Capacitance		1000pF typ.		
	EMC Emission		Parameter	Standard	Test Level / Note
			Conducted	EN55032(CISPR32)	N/A
			Radiated	EN55032(CISPR32)	Class A
	EMC Immunity		Parameter	Standard	Test Level / Note
			ESD	BS IEC 61000-4-2	Contact ±4KV
			Radiated Susceptibility	BS IEC 61000-4-3	3V/m
			EFT/Burst	BS IEC 61000-4-4	±0.5KV
			Surge	BS IEC 61000-4-5	Line-Line ±0.5KV
			Conducted	BS IEC 61000-4-6	3Vrms
			Magnetic field immunity	BS IEC 61000-4-8	1A/m
	OTHERS	MTBF ⁴		>500,000Hours	
Weight		33.0g typ.	For FEW-E		
Dimension (L*W*H)		50.8mm*25.4mm*11.2mm			
ST		HSST(L*W*H)	76mm*31.5mm*21.2mm	76mm*31.5mm*25.75mm	
Case Material		Six-side shielded case			
NOTE	¹ Ripple & noise are measured at 20MHz BW with 1uF ceramic capacitor connect to the output pins.				
	² High line to low line.				
	³ Load regulation is for output load current change from 6% to 100%.				
	⁴ MIL-HDBK-217F @25 °C, Ground Benign.				
	*All specifications are measured at Ta=25°C, humidity < 75%, nominal input voltage, and rated output load unless otherwise specified.				

MECHANICAL SPECIFICATION

FEW-B30E

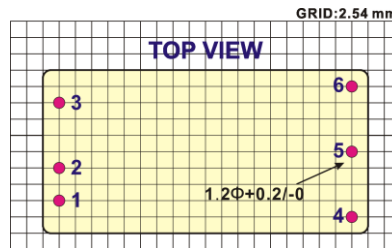


PIN CONNECTION		
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	Remote On/Off	
4	+Vout	+Vout
5	-Vout	Common
6	Trim	-Vout

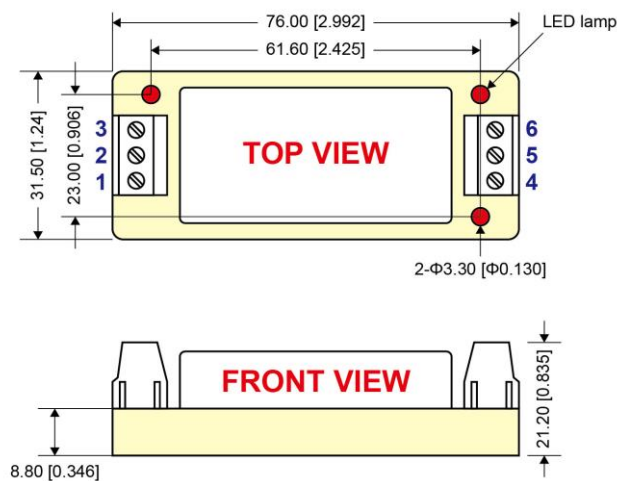
All dimensions are in mm[Inches]

Pin size is 1.0Φ ±0.10mm

Tolerance .X or .XX= ±0.5mm



FEW-B30EST



PIN-OUT		
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	Remote On/Off	
4	+Vout	+Vout
5	-Vout	Common
6	Trim	-Vout

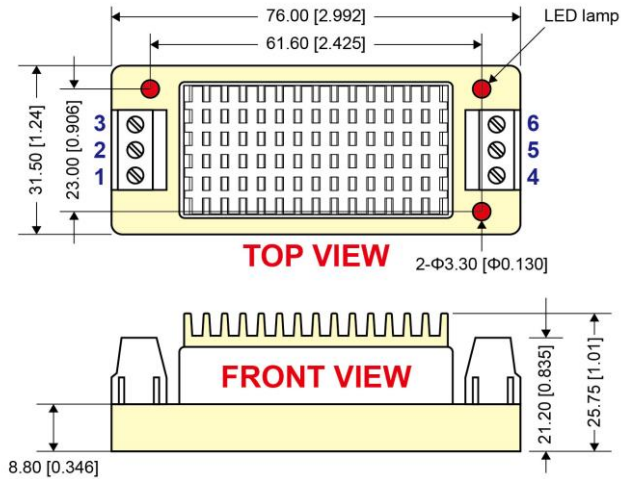
All dimensions are in mm[Inches]

Wire range: 24-12 AWG

Tightening torque: Max 0.4 N . m

General tolerances: ±1.00 [±0.039]

FEW-B30EHSST



PIN-OUT		
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	Remote On/Off	
4	+Vout	+Vout
5	-Vout	Common
6	Trim	-Vout

All dimensions are in mm[Inches]

Wire range:24-12 AWG

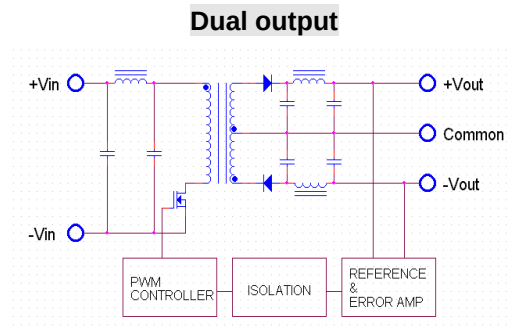
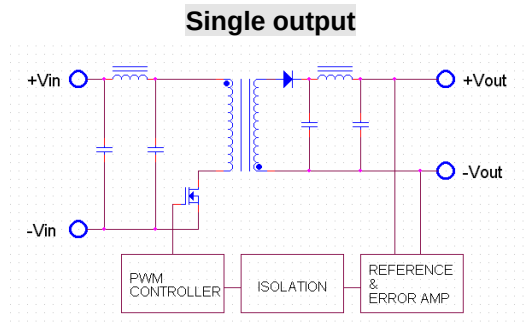
Tightening torque: Max 0.4 N . m

General tolerances: ± 1.00 [± 0.039]

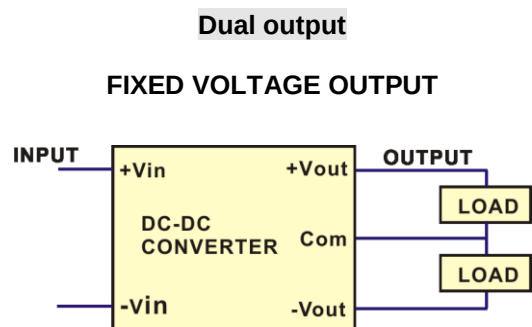
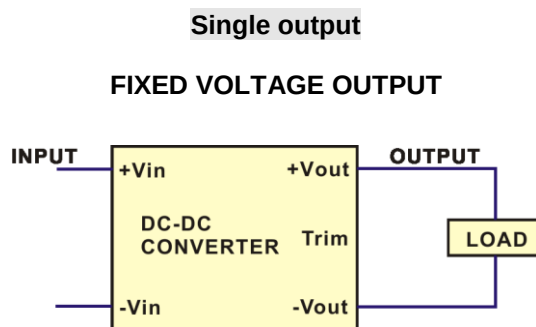
REMOTE ON/OFF CONTROL

Remote On/Off Control			
Control Input		PIN3	Control Common
Control Voltage			PIN2
ON		Converter Shutdown Idle Current	
OFF		10mA	
> 2.5 ~ 75VDC or Open Circuit		CMOS or Open	
< 1.0VDC or Jumper to PIN2		Collector TTL	

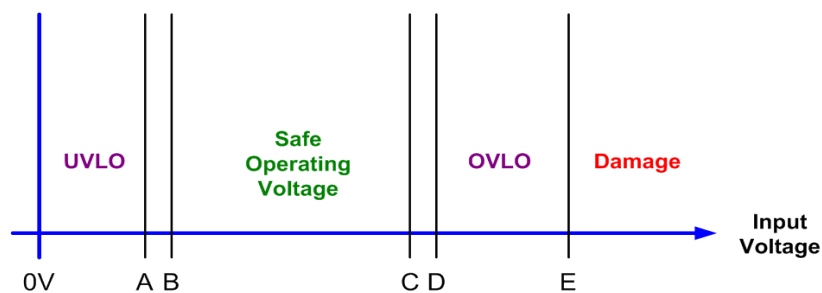
SIMPLIFIED SCHEMATIC



TYPICAL APPLICATIONS



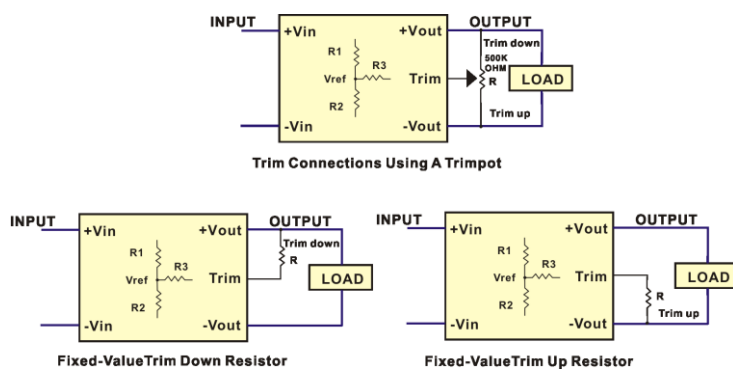
INPUT OPERATING VOLTAGE



	A	B	C	D	E
FEW*-24****E	8.8V typ.	9V	75V	87V typ.	100V

EXTERNAL OUTPUT TRIMMING

Trim up and trim down resistor values



Vout	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref
3.3	2.43	1.47	7.5	1.24
5	1	1	3.9	2.5
12	3.83	1	7.5	2.5
15	7.5	1.5	11	2.5
24	8.66	1	8.2	2.5

Trim-down:

$$A = [(Vo' - Vref) / Vref] * R2$$

$$RT\text{-down} = [(A * R1) / (R1 - A)] - R3$$

Trim-up:

$$A = [Vref / (Vo' - Vref)] * R1$$

$$RT\text{-up} = [(A * R2) / (R2 - A)] - R3$$

For example :

Vout=12V

Trim=+/-10% (13.2V / 10.8V)=Vo'

trim=-10% (-10.8v)=Vo'

Trim-down:

$$A = [(Vo' - Vref) / Vref] * R2$$

$$= [(10.8 - 2.5) / 2.5] * 1$$

$$= 3.32$$

$$RT\text{-down} = [(A * R1) / (R1 - A)] - R3$$

$$= [(3.32 * 3.83) / (3.83 - 3.32)] - 7.5$$

$$= (12.715 / 0.51) - 7.5$$

$$= 24.931 - 7.5$$

$$= 17.431K\Omega$$

trim=+10% (+13.2v)=Vo'

Trim-up:

$$A = [Vref / (Vo' - Vref)] * R1$$

$$= [2.5 / (13.2 - 2.5)] * 3.83$$

$$= 0.894$$

$$RT\text{-up} = [(A * R2) / (R2 - A)] - R3$$

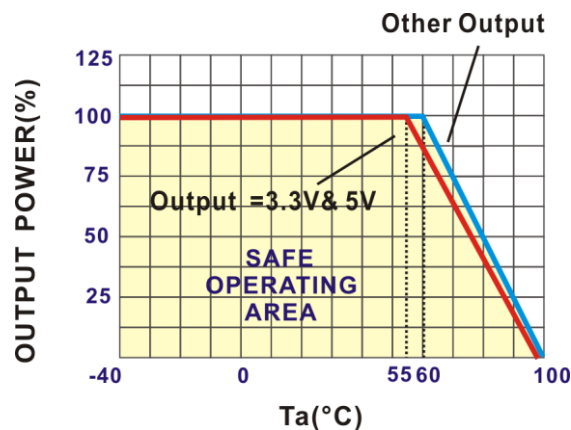
$$= [(0.894 * 1) / (1 - 0.894)] - 7.5$$

$$= (0.894 / 0.106) - 7.5$$

$$= 8.433 - 7.5$$

$$= 0.933K\Omega$$

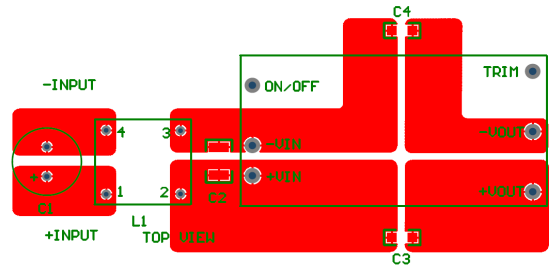
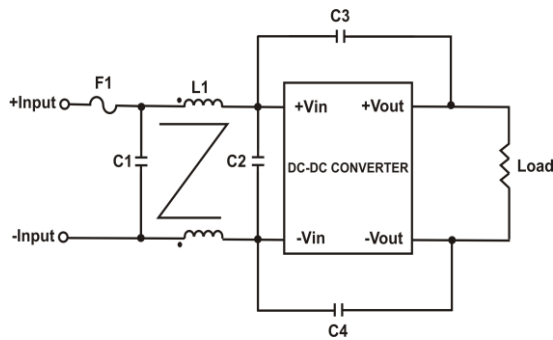
DERATING CURVE



RECOMMENDED FILTER FOR EN55032 CLASS B

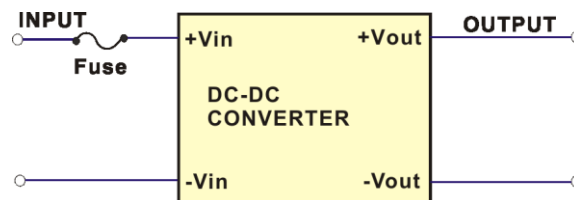
The components used in the above figure, together with the manufacturer's part numbers for these components, are as follows:

	C1	C2	C3	C4	L1
FEW*-24*****	47 μ F/100V	2.2uF/100V 1210 MLCC	1000pF/5KV MLCC	1000pF/5KV MLCC	325uH Common Choke



INPUT FUSE SELECTION GUIDE

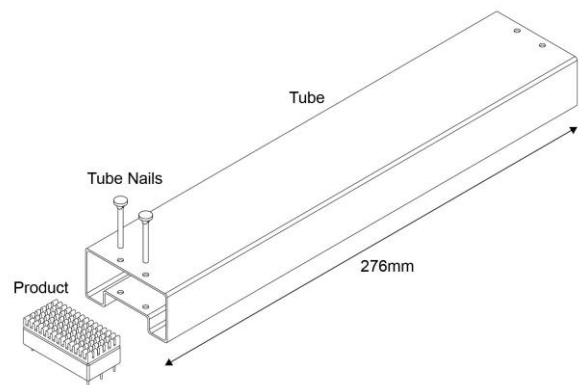
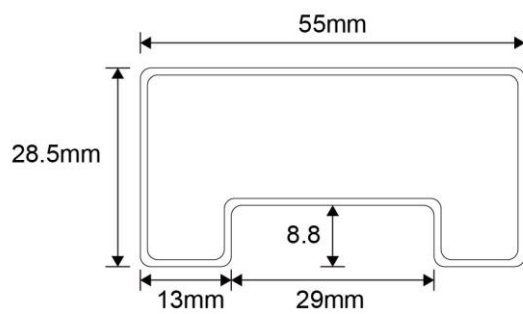
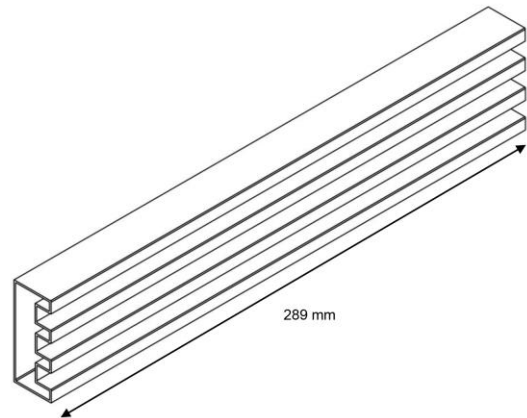
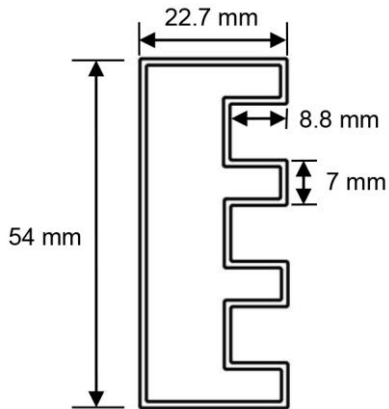
9-75V Input Voltage (Vdc)
8000mA Slow-Blow Type



Note: Certain applications may require the installation of external fuse in front of the input.



■ PACKAGING INFORMATION



Packaging Quantity: 10 pcs converter per tube



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