



FEW-A20E SERIES

20W 8:1 DC-DC Converter



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
- Overload protection & UVLO
- 3000Vdc I/O isolation

APPLICATIONS

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

DESCRIPTION

FEW-A20E series is a 20W 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, ST and HSST models adding additional input reverse polarity protection, and so on.

MODEL ENCODING

<u>FEW</u>	<u>S</u>	-	<u>24</u>	<u>05</u>	<u>A</u>	<u>20</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-2403.3A20E			10	809	3.3	0~5000	85	1000uF
FEWS-2405A20E			10	958	5	0~4000	87	1000uF
FEWS-2412A20E	24	9~75	20	947	12	0~1666	88	220uF
FEWS-2415A20E			20	947	15	0~1333	88	220uF
FEWS-2424A20E			20	947	24	0~833	88	100uF
FEWD-2412A20E	24	9~75	20	947	±12	±0~833	88	±100uF
FEWD-2415A20E			20	947	±15	±0~666	88	±100uF

Note:

Efficiency and input current are measured at nominal input voltage and full load.

Other input to output voltages may be available. Please contact factory.

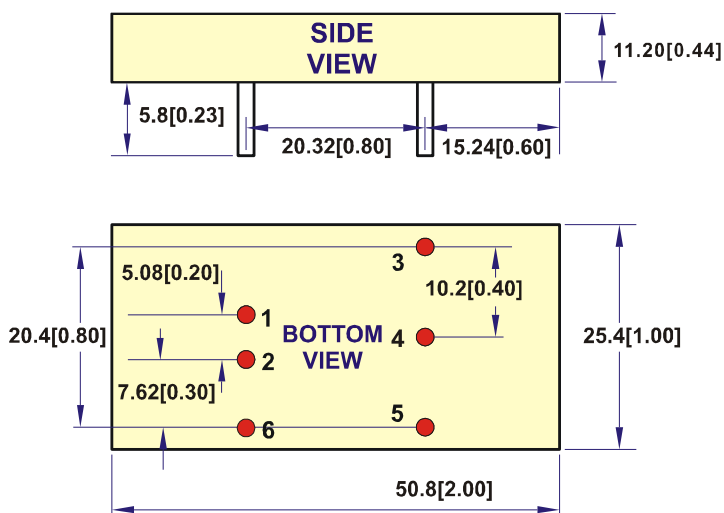
The minimum input voltage and starting voltage of ST and HSST models are 1VDC higher than those of DIP package due to input reverse polarity protection function.

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 7)		
	Under Voltage Lockout	Start-up voltage : 8.8 Vdc Shutdown voltage : 7.5 Vdc		
	Remote Control	(see page 4)		
	OUTPUT	Voltage Accuracy	±2% max.	
Rated Power		20W		
Ripple & Noise ¹		150mV Vp-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)		
PROTECTION	Short Circuit	Protection type : continuous, recovery		
	Overload	110%~230%	Protection type : recovers automatically after fault condition is removed	
	Over Voltage	Clamp by TVS diodes		
ENVIRONMENT	Cooling	Free-air convection		
	Working Temperature	-40~ +90°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	Air±8KV, 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	>600,000Hours		
	Weight	31.0g typ.		
	Dimension(L*W*H)	50.8mm*25.4mm*11.2mm		
	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 5% 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



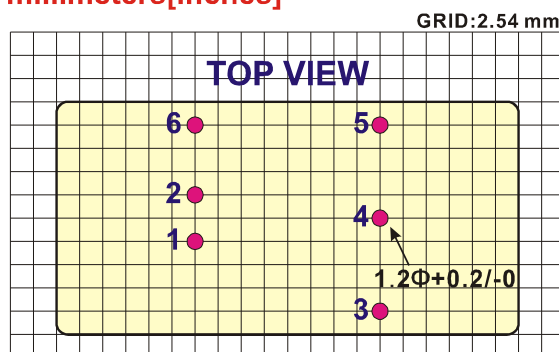
PIN CONNECTION		
PIN	SINGLE	DUAL
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	Trim	Common
5	-Vout	-Vout
6	Remote On/Off	

All dimensions are in mm[Inches]

Pin size is 1.0Φ ±0.10mm

Tolerance .X or .XX= ±0.5mm

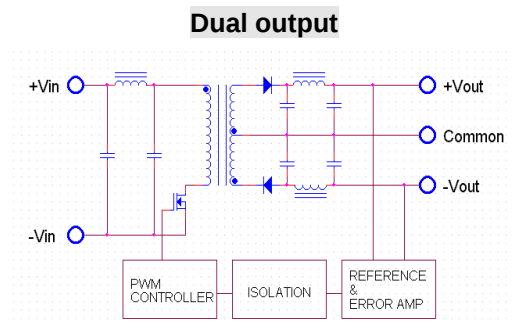
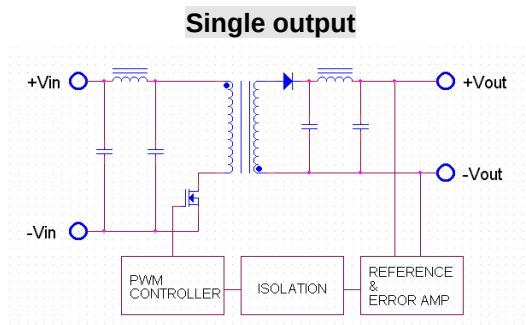
All dimensions are in millimeters[inches]



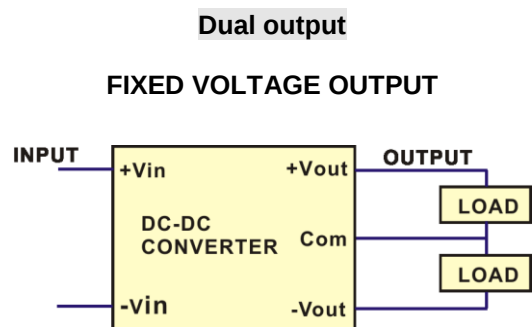
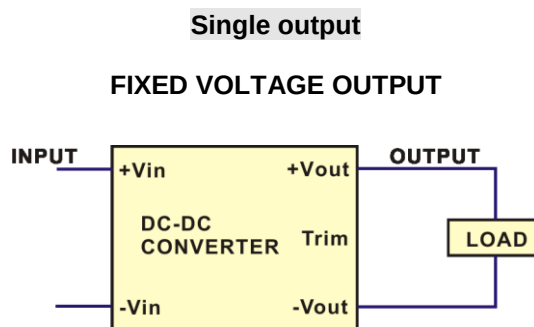
REMOTE ON/OFF CONTROL

Remote On/Off Control			
Control Input		PIN6	Control Common
Control Voltage			PIN2
ON		> 2.5 ~ 30VDC or Open Circuit	Converter Shutdown Idle Current
OFF		< 1.0VDC or Jumper to PIN2	10mA
		Logic Compatibility	CMOS or Open Collector TTL

■ SIMPLIFIED SCHEMATIC

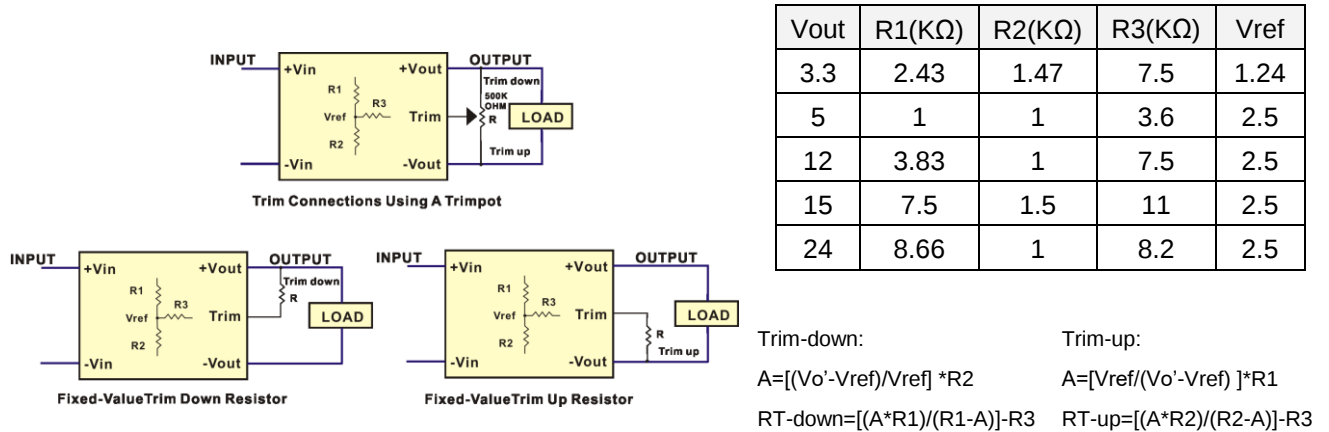


■ TYPICAL APPLICATIONS



EXTERNAL OUTPUT TRIMMING

Trim up and trim down resistor values



For example :

Vout=12V

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

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

Trim-down:

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

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

$= 3.32$

$RT-down = [(A * R1) / (R1 - A)] - R3$

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

$= (12.715 / 0.51) - 7.5$

$= 24.931 - 7.5$

$= 17.431K\Omega$

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

Trim-up:

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

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

$= 0.894$

$RT-up = [(A * R2) / (R2 - A)] - R3$

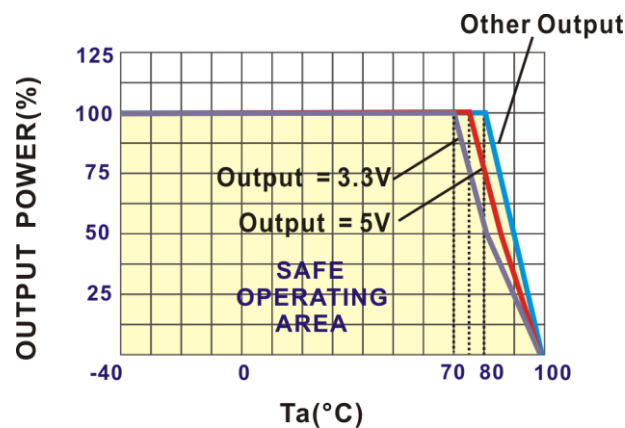
$= [(0.894 * 1) / (1 - 0.894)] - 7.5$

$= (0.894 / 0.106) - 7.5$

$= 8.433 - 7.5$

$= 0.933K\Omega$

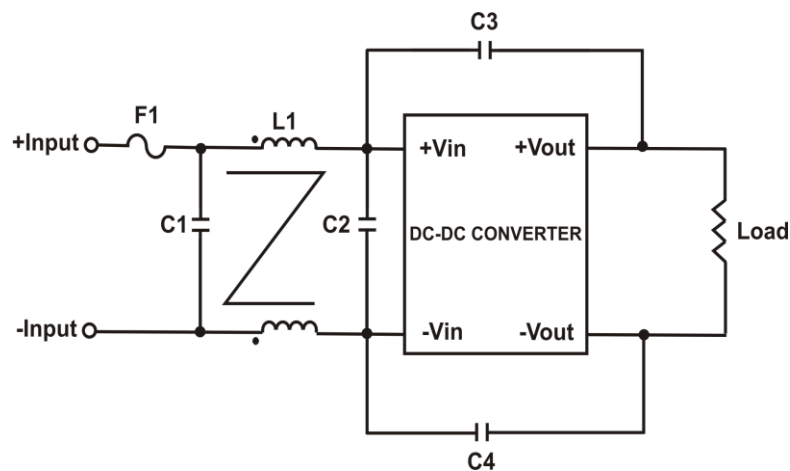
DERATING CURVE



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:

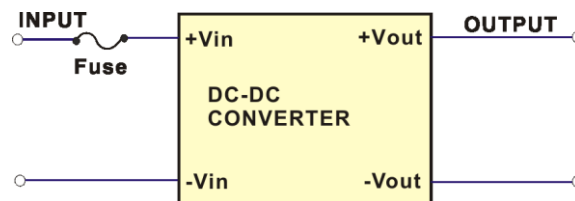
	C1	C2	C3	C4	L1
FEW*-24*****	47 μ F/100V	2.2uF/100V	1000pF/5KV	1000pF/5KV	325uH Common Choke



INPUT FUSE SELECTION GUIDE

9-75V Input Voltage (Vdc)

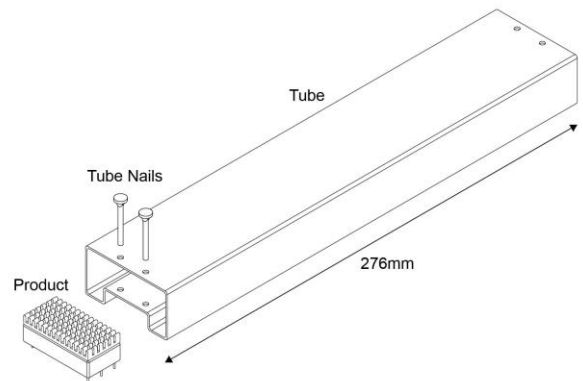
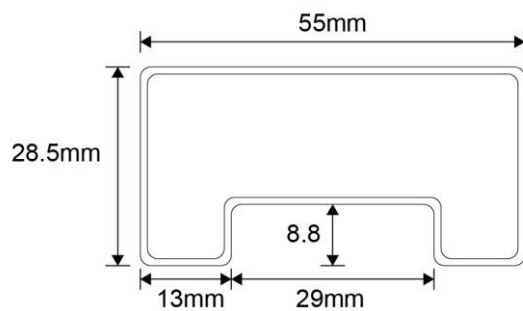
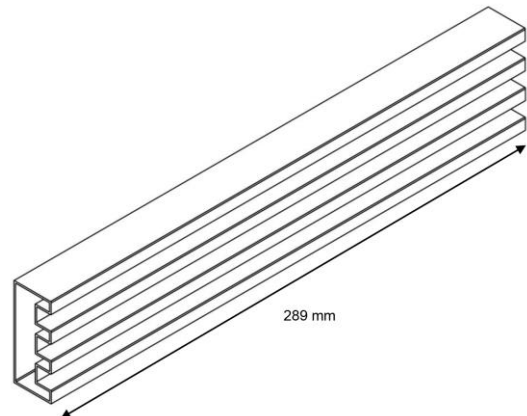
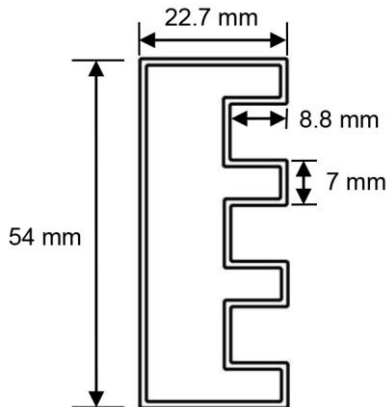
6000mA Slow-Blow Type



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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