



FEATURES

- DIP 1"x 1" package with standard pinout
- 8:1 Wide input range
- High efficiency up to 88%
- No minimum load required
- No external components required internal filtering
- Power saving load for high efficiency at light load
- Overload protection & UVLO
- 3000Vdc I/O isolation
- Low cost

APPLICATIONS

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

DESCRIPTION

DCW-E series is a 15W DC-DC converter product with 1"x1" standard industrial package. It contains 8:1 extra wide input voltage range, and features high efficiency up to 88%, 3000Vdc isolation voltage between input and output, and wide working temperature range from -40°C up to +85°C with no additional heat-sink. The models meet radiated Class A of EN55032 without external components, and suit all kinds of systems like industrial control, automation field, and so on.

MODEL ENCODING

DCW	S	-	24	05	E
Series Name	Output Quantity		Input Voltage	Output Voltage	Input Range
	S : Single	24	: 9~75V	03.3 : 3.3V	E: 8:1 , 3KVdc Isolation
	D : Dual			05 : 5V ; ±5V	
				12 : 12V ; ±12V	
				15 : 15V ; ±15V	
				24 : 24V	

■ 8:1 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				
DCWS-2403.3E			5	485	3.3	0~3000	85	680uF
DCWS-2405E			6	710	5	0~3000	88	680uF
DCWS-2412E	24	9~75	7	718	12	0~1250	87	330uF
DCWS-2415E			8	710	15	0~1000	88	220uF
DCWS-2424E			13	718	24	0~625	87	100uF
DCWD-2405E			7	744	±5	±0~1500	84	±330uF
DCWD-2412E	24	9~75	13	718	±12	±0~625	87	±150uF
DCWD-2415E			16	710	±15	±0~500	88	±100uF

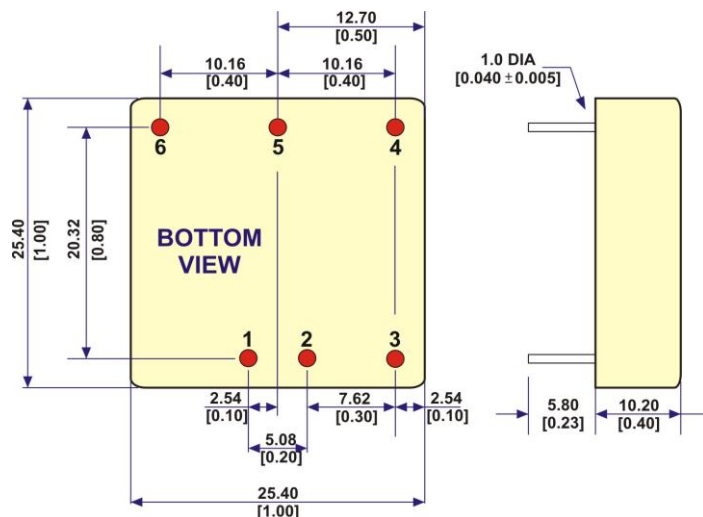
Note: Efficiency and input current are measured at nominal input voltage and full load.

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

SPECIFICATION

	Voltage Range	9~75V		
	Surge Voltage(100ms max.)	24Vin models : 100Vdc		
	Filter	Pi network		
	Remote Control	See page 4		
	Under Voltage Lockout	Start-up voltage : 8.8 Vdc Shutdown voltage : 8 Vdc		
	Protection	Fuse recommended (see page 7)		
	OUTPUT	Voltage Accuracy	±2% max.	
Rated Power		15W		
Ripple & Noise ¹		3.3~5V : 100mV Vp-p	12~24V : 1% Output Vp-p max.	
Line Regulation ²		±0.5%		
Load Regulation ³		±0.5%	±1% for 3.3Vdc	
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%~200% Protection type : recovers automatically after fault condition is removed		
	Over Voltage	Clamp by TVS diode		
ENVIRONMENT	Cooling	Free-air convection		
	Working Temperature	-40~ +85°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	>570,000Hours		
	Weight	18.0g typ.		
	Dimension(L*W*H)	25.4mm*25.4mm*10.2mm		
	Case Material	Five-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	Remote	
4	-Vout	-Vout
5	Trim / NP**	Common
6	+Vout	+Vout

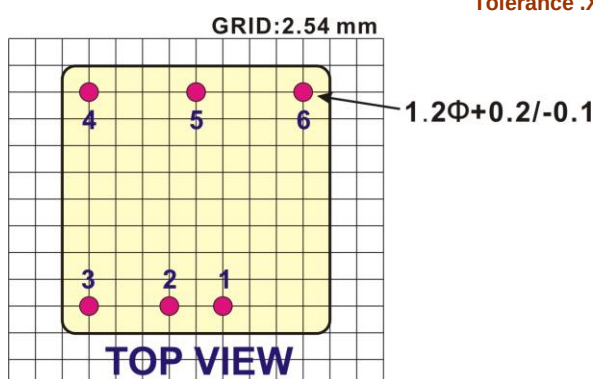
All dimensions are in mm[Inches]

NP : No pin

****Single output for 24V: PIN 5 = NP**

Pin size is $1.0\Phi \pm 0.10\text{mm}$

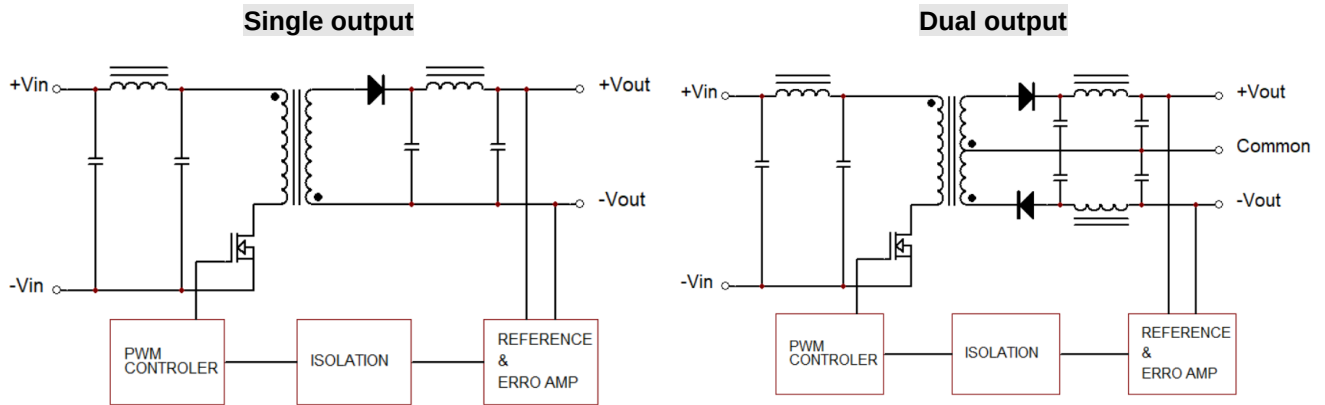
Tolerance .X or .XX= $\pm 0.5\text{mm}$



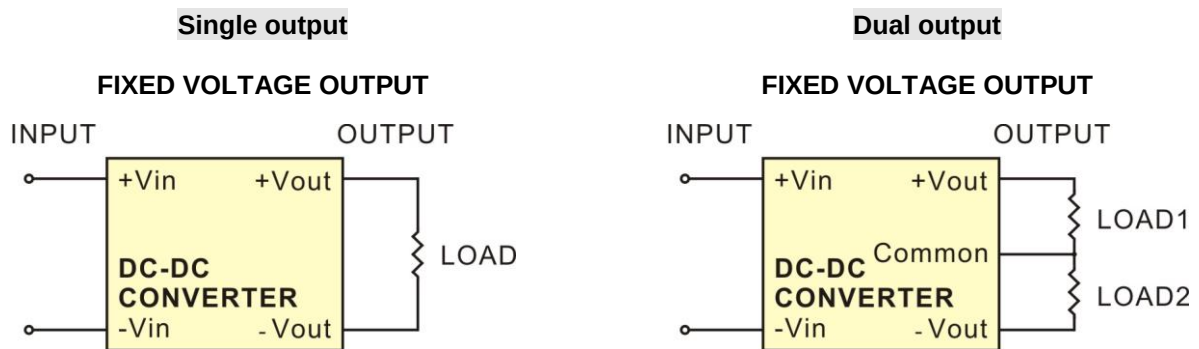
■ REMOTE ON/OFF CONTROL

Remote On/Off Control			
Control Input		PIN3	Control Common
Control Voltage			PIN2
		Converter Shutdown Idle Current	10mA
ON	> 2.5 ~ 30VDC or Open Circuit	CMOS or Open	
OFF	< 1.0VDC or Jumper to PIN2	Logic Compatibility	Collector TTL

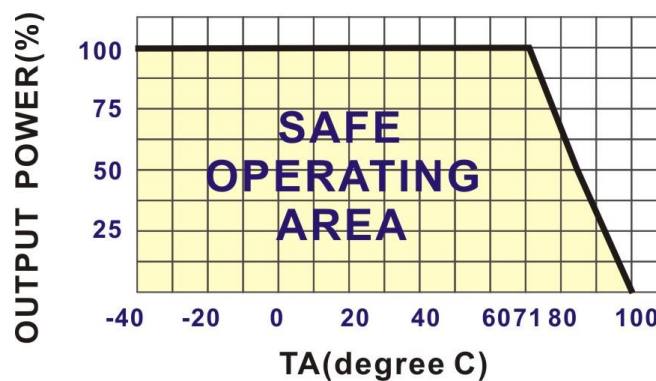
SIMPLIFIED SCHEMATIC



TYPICAL APPLICATIONS

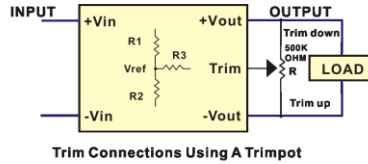


DERATING CURVE

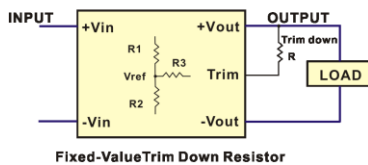


EXTERNAL OUTPUT TRIMMING

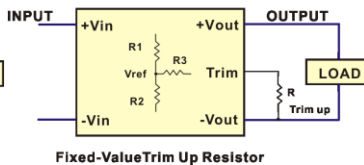
Trim up and trim down resistor values



Trim Connections Using A Trimpot



Fixed-Value Trim Down Resistor



Fixed-Value Trim Up Resistor

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

Trim-down:

$$A = [(V_o' - V_{ref}) / V_{ref}] * R_2$$

$$RT\text{-down} = [(A * R_1) / (R_1 - A)] - R_3$$

Trim-up:

$$A = [V_{ref} / (V_o' - V_{ref})] * R_1$$

$$RT\text{-up} = [(A * R_2) / (R_2 - A)] - R_3$$

For example :

Vout=12V

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

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

Trim-down:

$$A = [(V_o' - V_{ref}) / V_{ref}] * R_2$$

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

$$= 3.32$$

$$RT\text{-down} = [(A * R_1) / (R_1 - A)] - R_3$$

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

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

$$= 24.931 - 7.5$$

$$= 17.431K\Omega$$

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

Trim-up:

$$A = [V_{ref} / (V_o' - V_{ref})] * R_1$$

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

$$= 0.894$$

$$RT\text{-up} = [(A * R_2) / (R_2 - A)] - R_3$$

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

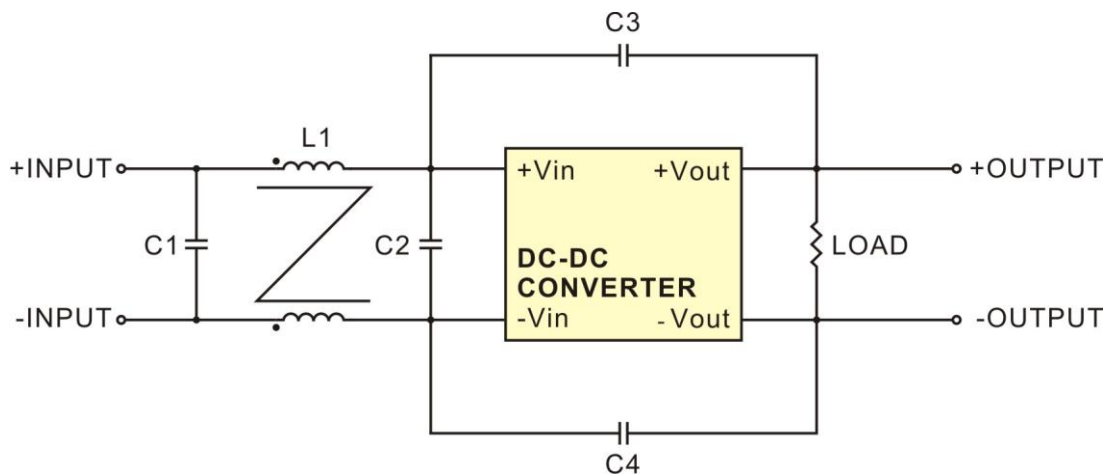
$$= (0.894 / 0.106) - 7.5$$

$$= 8.433 - 7.5$$

$$= 0.933K\Omega$$

RECOMMENDED FILTER FOR EN55032 CLASS B

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



MODEL NUMBER	C1	C2	C3	C4	L1
DCWX-24XXE	2.2uF/100V MLCC	X	X	X	500uH Common Choke

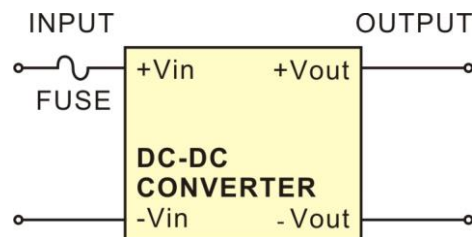
Note: All of capacitors are ceramic capacitors.



■ INPUT FUSE SELECTION GUIDE

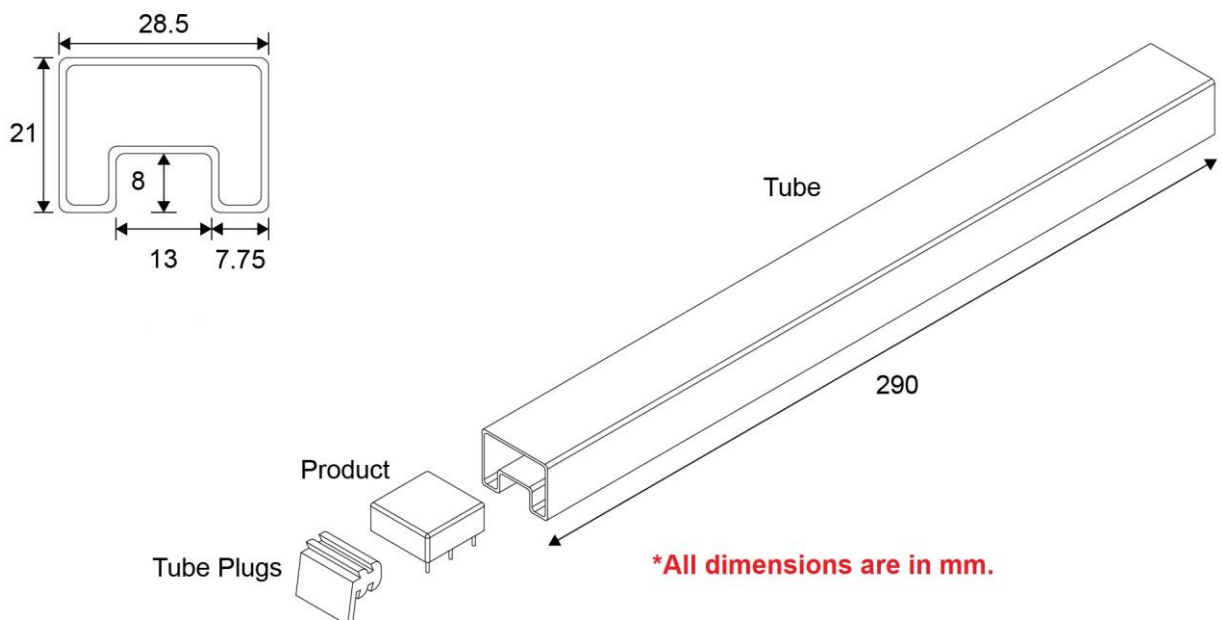
9-75V Input Voltage (Vdc)

4000mA 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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