

## DC/DC Converter

### SPVxx-27BxxR2 Series



# SCHMID-M

New energy isolation converter with  
Ultra-wide & ultra-high input voltage of 100-1000VDC



## FEATURES

- Input voltage up to 1000VDC
- Wide input voltage range (10:1): 100 -1000VDC
- Industrial grade operating temperature: -40°C to +70°C
- 4KVAC high isolation voltage
- High efficiency, Low ripple & noise
- Reverse input voltage protection, Output short circuit, over-voltage protection
- EN62109 approval
- High reliability, long life
- Mounting: PCB mounting, Chassis mounting, DIN-Rail mounting available

SPVxx-27BxxR2 series are regulated output DC/DC converters with features of 100-1000VDC ultra-wide and ultra-high voltage input, high efficiency and high reliability. They can be widely used in photovoltaic power generation, high-voltage inverter and so on, which provide stable operating voltage to the equipment and improve the power and the load's safety performance with multiple protection when working under abnormal conditions.

## Selection Guide

Certification	Model*	Output Power	Nominal Output Voltage and Current(Vo/Io)	Efficiency (200VDC, %/Typ.)	Max. Capacitive Load(μF) (Full load)
CE	SPV05-27B05R2 (A2C/A4C)	5W	5V/1A	72	6000
	SPV10-27B05R2 (A2C/A4C)	10W	5V/2A	72	6000
	SPV10-27B09R2 (A2C/A4C)		9V/1.11A	76	4000
	SPV10-27B24R2 (A2C/A4C)		24V/0.42A	80	470
	SPV15-27B12R2 (A2C/A4C)	15W	12V/1.25A	77	2000
	SPV15-27B15R2 (A2C/A4C)		15V/1A	78	1200
	SPV15-27B24R2 (A2C/A4C)		24V/0.625A	80	470

Note:\*Part No. with suffix of "A2/A2C" means chassis mounting and suffix of "A4/A4C" means DIN-Rail mounting (e.g. SPV05-27B05R2A2/A2C means chassis mounting; SPV05-27B05R2A4 /A4C means DIN-Rail mounting), A2C /A4C have CE certification.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Voltage Range		100	--	1000	VDC
Input Current	SPV05 model	200VDC	--	38	mA
		600VDC	--	15	
		1000VDC	--	10	
	SPV10 model	200VDC	--	75	
		600VDC	--	25	
		1000VDC	--	16	
	SPV15 model	200VDC	--	120	
		600VDC	--	40	
		1000VDC	--	22	
Inrush Current	200VDC	--	7	--	A
	600VDC	--	20	--	
	1000VDC	--	30	--	
External Input Fuse(A2 chassis mounting and A4 DIN-Rail mounting package series include fuse)	SPV05/ SPV10 model	Necessary, 1A			
	SPV15 model	Necessary, 2A			
Hot Plug		Unavailable			

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### Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±2	%
Line Regulation		--	±0.5	±1	
Load Regulation		--	±0.5	±1	
Ripple & Noise*	20MHz bandwidth (peak-peak value)	--	100	200	mV
Temperature Drift Coefficient		--	±0.02	--	%/°C
Short Circuit Protection		Continuous, self-recovery			
Over-current Protection		≥ 110%Io self-recovery			
Over-voltage Protection	SPVxx-27B05R2	≤ 7.5VDC			
	SPVxx-27B09R2	≤ 12VDC			
	SPVxx-27B12R2	≤ 15VDC			
	SPVxx-27B15R2	≤ 19VDC			
	SPVxx-27B24R2	≤ 28VDC			
Min. Load		0	--	--	%
Delay Time	200~1000VDC	--	--	1	s

Note: \* Ripple and noise are measured by "parallel cable" method, please see AC-DC Converter Application Notes for specific operation.

### General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output Test time: 1min	4000	--	--	VAC
Operating Temperature		-40	--	+70	°C
Storage Temperature		-40	--	+105	
Storage Humidity		--	--	95	%RH
Welding Temperature	Wave-soldering	260±5°C; time:5~10s			
	Manual-welding	360±10°C; time:3~5s			
Switching Frequency		--	--	75	kHz
Power Derating	+50°C to +70°C SPV10/15-27BxxR2	2	--	--	%/°C
MTBF		MIL-HDBK-217F@25°C > 300,000 h			

### Physical Specifications

Casing Material	Black flame-retardant and heat-resistant plastic (UL94V-0)				
Dimensions	Horizontal package	70.00*48.00*23.50 mm			
	A2/A2C chassis mounting	96.10*54.00*32.00 mm			
	A4/A4C DIN-Rail mounting	96.10*54.00*36.60 mm			
Weight	Horizontal package	95g (Typ.)			
	A2/A2C chassis mounting	150g (Typ.)			
	A4/A4C DIN-Rail mounting	190g (Typ.)			
Cooling method	Free air convection				

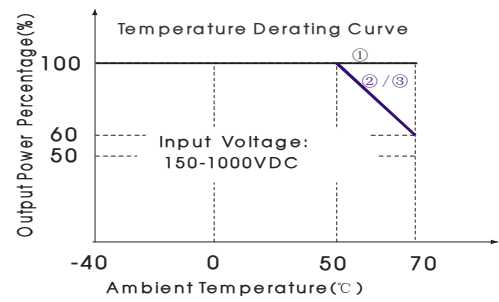
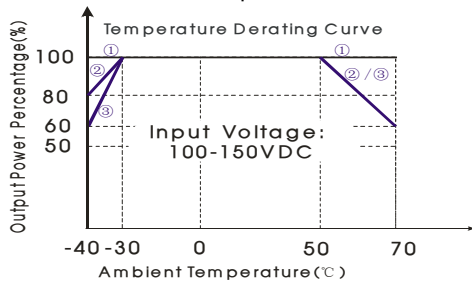
### EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS A(See Fig. 2 for recommended circuit)		
	RE	CISPR22/EN55022	CLASS A(See Fig. 2 for recommended circuit)		
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV		Perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m		perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV (See Fig. 2 for recommended circuit)		perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (See Fig. 2 for recommended circuit)		perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s		perf. Criteria A

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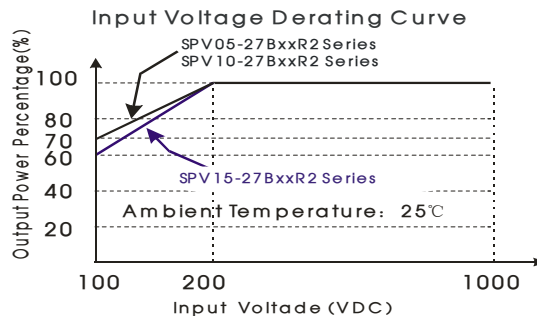
### Product Characteristic Curve



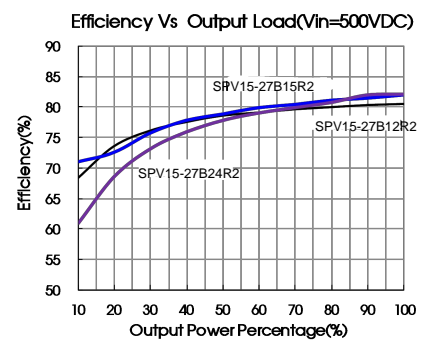
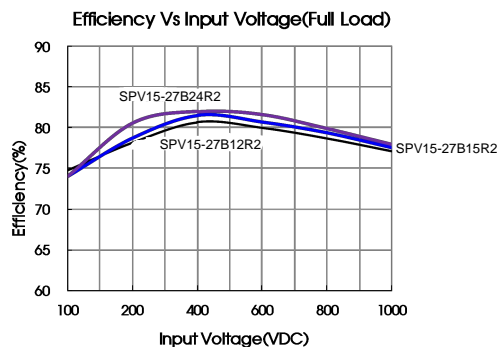
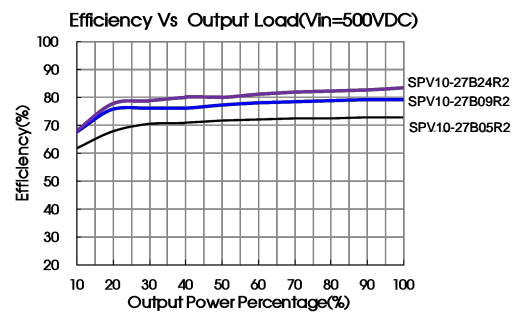
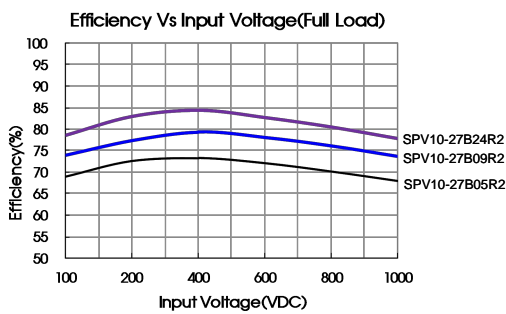
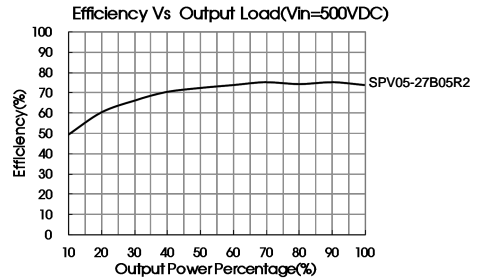
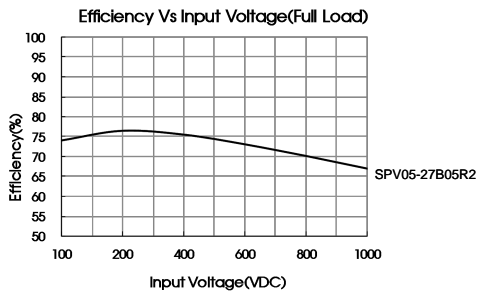
Note:

1. For SPV05-27BxxR2 Series, derating curve is line ①;  
for SPV10-27BxxR2 Series, derating curve is line ②;  
for SPV15-27BxxR2 Series, derating curve is line ③.

2. This product is suitable for use in natural air cooling environments, if in a closed environment, please contact our company's FAE.



Note: The actual output power = Nominal output power x Temperature derating x Input voltage derating.



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## SPVxx-27BxxR2 Series

### Design Reference

#### 1. Typical application circuit

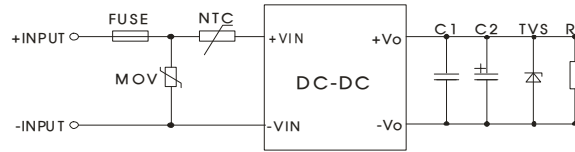


Fig. 1

Model	FUSE	MOV	NTC	C1(μF)	C2(μF)	TVS
SPV05-27B05R2	1A	S14K880	10D-11	1	220	SMBJ7.0A
SPV10-27B05R2					220	SMBJ7.0A
SPV10-27B09R2					120	SMBJ12A
SPV10-27B24R2					68	SMBJ33A
SPV15-27B12R2	2A				120	SMBJ15A
SPV15-27B15R2					120	SMBJ20A
SPV15-27B24R2					68	SMBJ33A

Note:  
Output filtering capacitor C2 is electrolytic capacitor, it is recommended to apply electrolytic capacitor with high frequency and low resistance. For capacitance and current of capacitor please refer to manufacture's datasheet. Capacitance withstand voltage derating should be 80% or above. C1 is ceramic capacitor, which is used to filter high-frequency noise. TVS is a recommended component to protect post-circuits if converter fails.

#### 2. EMC solution-recommended circuit

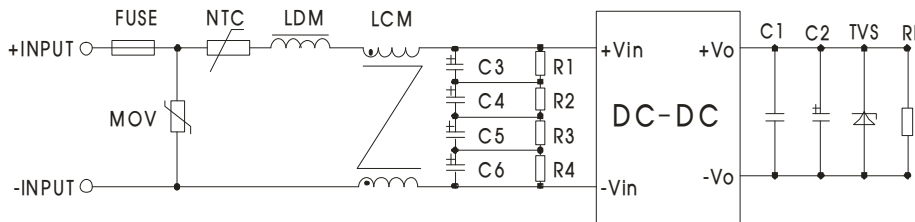


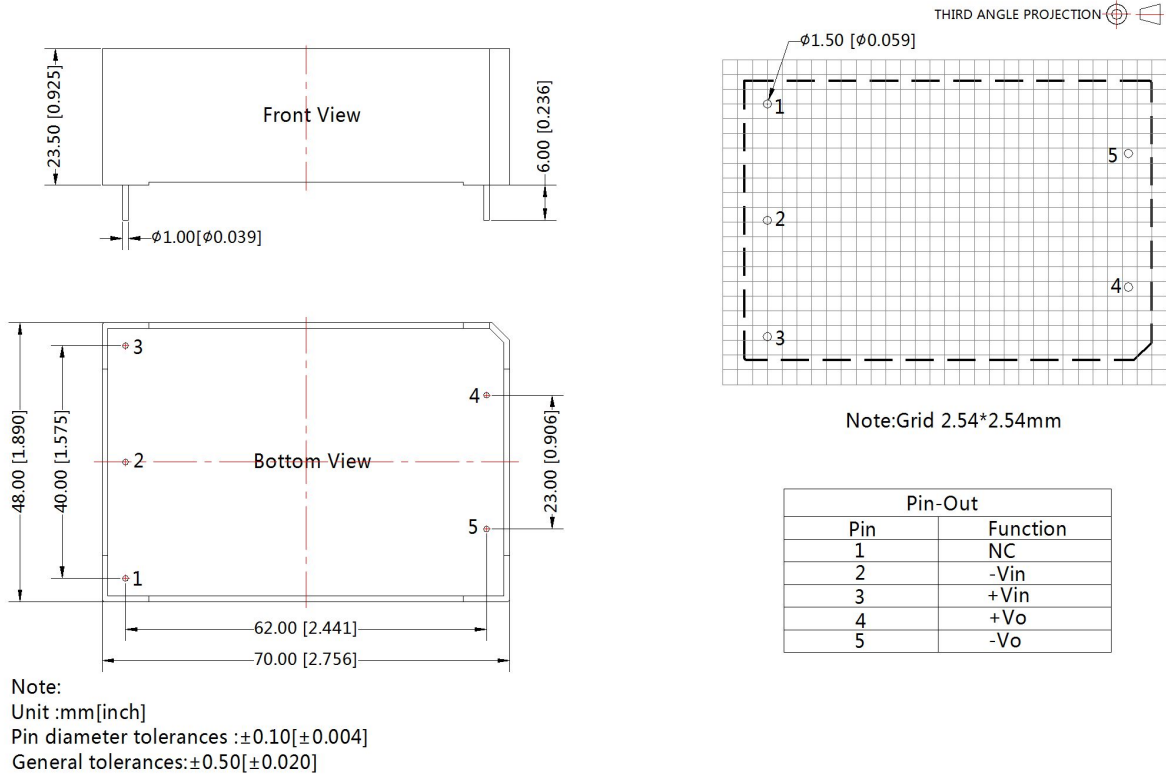
Fig. 2(Output external circuit refer to the typical application circuit)

Element model	Recommended value
MOV	S14K880
C3, C4, C5, C6	47μF/400VDC
R1, R2, R3, R4	1MΩ/2W
NTC	10D-11
LDM	4.7mH/0.38A
LCM	10mH, recommended to use SCHMID-M's SFL2D-Z5-103
FUSE	1A, necessary (SPV05-27B xxR2/ SPV10-27BxxR2)
	2A, necessary (SPV15-27BxxR2)

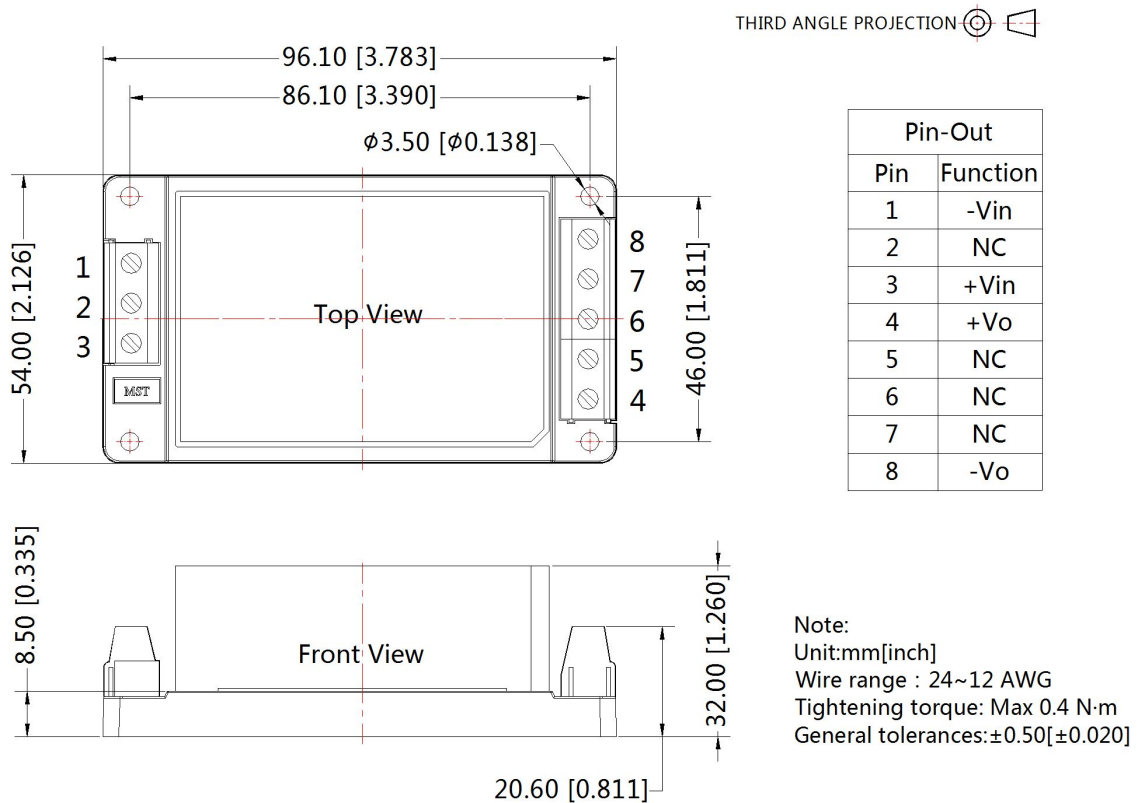
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### Dimensions and Recommended Layout



### A2 chassis mounting Dimensions

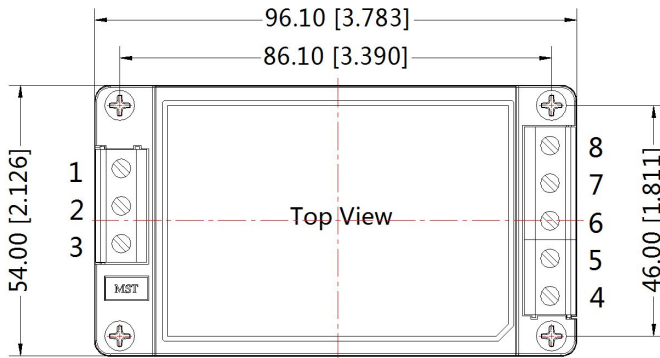


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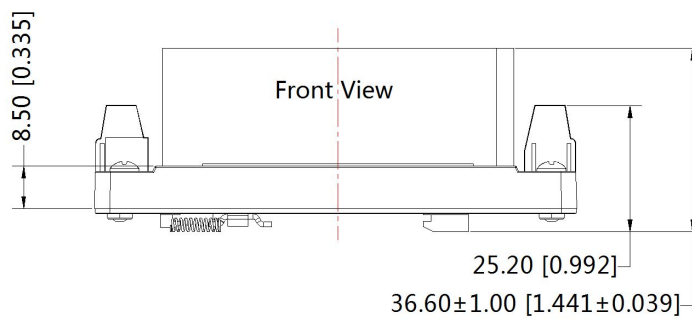
## SPVxx-27BxxR2 Series

### A4 Din-Rail mounting Dimensions

THIRD ANGLE PROJECTION 



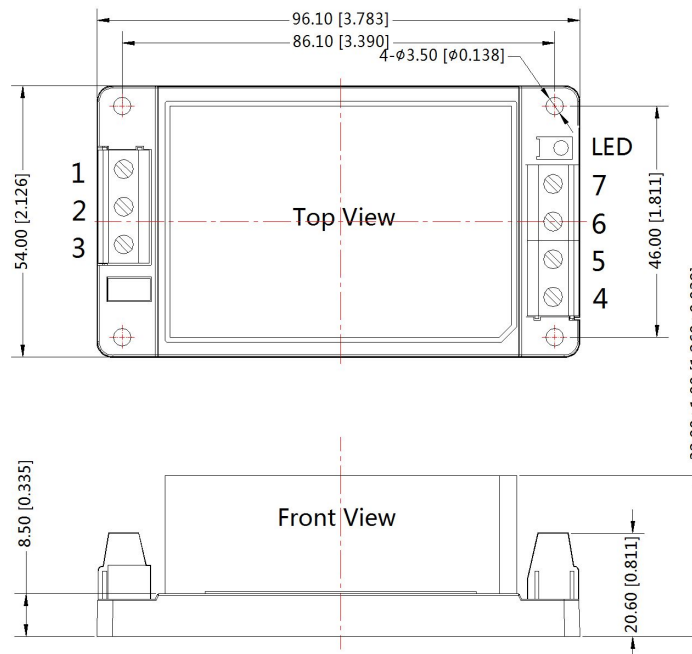
Pin-Out	
Pin	Function
1	-Vin
2	NC
3	+Vin
4	+Vo
5	NC
6	NC
7	NC
8	-Vo



Note:  
 Unit:mm[inch]  
 Installed on DIN rail TS35  
 Wire range : 24~12 AWG  
 Tightening torque: Max 0.4 N·m  
 General tolerances:±0.50[±0.020]

### A2C chassis mounting Dimensions

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Function
1	-Vin
2	NC
3	+Vin
4	+Vo
5	NC
6	NC
7	-Vo

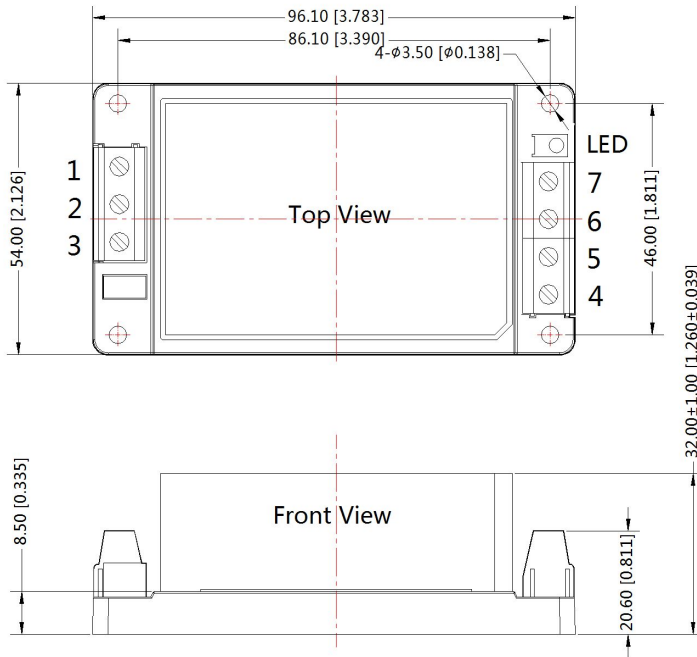
Note:  
 Unit:mm[inch]  
 Wire range : 24~12 AWG  
 Tightening torque: Max 0.4 N·m  
 General tolerances:±0.50[±0.020]

# DC/DC Converter

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### A4C Din-Rail mounting Dimensions

THIRD ANGLE PROJECTION 



Pin-Out	
Pin	Function
1	-Vin
2	NC
3	+Vin
4	+Vo
5	NC
6	NC
7	-Vo

Note:  
 Unit:mm[inch]  
 Wire range : 24~12 AWG  
 Tightening torque: Max 0.4 N·m  
 General tolerances:±0.50[±0.020]

Note:

1. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^\circ\text{C}$ , humidity<75% with nominal input voltage and rated output load;
2. All index testing methods in this datasheet are based on our Company's corporate standards;
3. We can provide product customization service, please contact our technicians directly for specific information;
4. Specifications are subject to change without prior notice.