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40W 1"x1" Package DC-DC Regulated Converter SKMW40 & DKMW40 series





UL62368-1

Automate Industrial Security Network Telecom

Features

- DIP 1"x1" package with industry standard pinout
- 4:1 ultrawide input range
- Operating temperature range -40 ~ +80℃
- No minimum load required
- Comply to BS EN/EN55032 Class A/B with additional components
- High efficiency up to 91%
- Protections: Short circuit (Continuous) / Overload / Over voltage / Over temperature / Input under voltage
- 2KVDC I/O isolation
- Remote ON/OFF control and Triming output (±10%)
- 3 years warranty

Applications

- Telecom/datacom system
- Wireless network
- Industrial control facility
- Instrument
- Energy battery
- Data switch
- Space saving solution

GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

Description

SKMW40 and DKMW40 series are 40W isolated and regulated module type DC-DC converter with DIP 1"x1" package. It features international standard pins, a high efficiency up to 91%, wide working temperature range -40~+80℃, 2KVDC I/P-O/P isolation voltage, compliance to BS EN/EN55032 Class A/B with additional components, continuous-mode short circuit, overload, over voltage, over temperature, input under voltage protection, remote ON/OFF and trimmable output voltage etc. The models account for different input voltage 9~36V and 18~75V 4:1 ultrawide input range, and various output voltage, 3.3V/5V/12V/15V/24V for single output and ±12V/±15V for dual outputs, which are suitable for all kinds of systems, Such as industrial control, telecommunication field, distributed power architecture, and so on.

Model Encoding

SKMW40F – 12

- 12 → Output voltage (3.3/5/12/15/24Vdc，±12/±15Vdc)
- F → Input voltage (F: 9~36Vdc，G: 18~75Vdc)
- 40 → Rated wattage
- SKMW → Series name { S:Single output / D:Dual output

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MODEL SELECTION TABLE

ORDER NO.	INPUT			OUTPUT		EFFICIENCY (TYP.)	CAPACITOR LOAD (MAX.)
	INPUT VOLTAGE (RANGE)	INPUT CURRENT		OUTPUT VOLTAGE	OUTPUT CURRENT		
		NO LOAD	FULL LOAD				
SKMW40F-03	Nominal 24V (9 ~ 36V)	12mA	1570mA	3.3V	0~10000mA	86%	10000μF
SKMW40F-05		12mA	1850mA	5V	0~8000mA	88%	6000μF
SKMW40F-12		12mA	1840mA	12V	0~3333mA	89%	3000μF
SKMW40F-15		12mA	1820mA	15V	0~2667mA	91%	1000μF
SKMW40F-24		12mA	1830mA	24V	0~1667mA	89%	680μF
DKMW40F-12		12mA	1870mA	±12V	±0 ~ 1667mA	88%	*1500μF
DKMW40F-15		12mA	1870mA	±15V	±0 ~1333mA	88%	*1000μF
SKMW40G-03	Nominal 48V (18 ~ 75V)	10mA	790mA	3.3V	0~10000mA	85%	10000μF
SKMW40G-05		10mA	940mA	5V	0~8000mA	88%	6000μF
SKMW40G-12		10mA	920mA	12V	0~3333mA	89%	3000μF
SKMW40G-15		10mA	940mA	15V	0~2667mA	88%	1000μF
SKMW40G-24		10mA	925mA	24V	0~1667mA	89%	680μF
DKMW40G-12		10mA	925mA	±12V	±0 ~1667mA	89%	*1500μF
DKMW40G-15		10mA	940mA	±15V	±0 ~1333mA	88%	*1000μF

* For each output

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SPECIFICATION				
INPUT	VOLTAGE RANGE	F: 9~36Vdc , G: 18~75Vdc		
	SURGE VOLTAGE (100ms max.)	24Vin models : 50Vdc, 48Vin models : 100Vdc		
	FILTER	Pi type		
	PROTECTION	Fuse recommended. 24Vin models: 8A delay time Type, 48Vin models: 5A delay time Type		
	INTERNAL POWER DISSIPATION	500mW		
	START UP TIME	Vo: 3.3V 50ms max., other: 30ms max.		
OUTPUT	VOLTAGE ACCURACY	±1.0%		
	RATED POWER	40W		
	RIPPLE & NOISE Note.2	75mVp-p		
	LINE REGULATION Note.3	Single output models: ±0.2%, Dual output models:±0.5%		
	LOAD REGULATION Note.4	Single output models: ±0.5%, Dual output models:±1%		
	SWITCHING FREQUENCY (Typ.)	3.3Vout models: 300KHz, other models: 400KHz		
	EXTERNAL TRIM ADJ. RANGE (Typ.)	±10% (Single output model only)		
PROTECTION	SHORT CIRCUIT	Protection type : Continuous, automatic recovery		
	OVERLOAD	110 ~ 200% rated output power		
		Protection type : Recovers automatically after fault condition is removed		
	OVER VOLTAGE	Protection type : Clamp by diode		
	OVER TEMPERATURE	Shut down o/p voltage, recovers automatically after temperature goes down		
	UNDER VOLTAGE LOCKOUT	Start-up voltage	24Vin (F-type): 8.8Vdc, 48Vin (G-type): 17.5Vdc	
		Shutdown voltage	24Vin (F-type): 8.5Vdc, 48Vin (G-type): 17Vdc	
FUNCTION	REMOTE CONTROL	Power ON: R.C. ~ -Vin >3.5~12Vdc or open circuit ; Power OFF: R.C. ~ -Vin <1.2Vdc or short		
ENVIRONMENT	COOLING	Free-air convection		
	WORKING TEMP.	-40 ~ +80℃ (Refer to "Derating Curve")		
	CASE TEMPERATURE	+110℃ max.		
	WORKING HUMIDITY	20% ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-55 ~ +125℃, 10 ~ 95% RH non-condensing		
	TEMP. COEFFICIENT	0.03% / ℃ (0 ~ 60℃)		
	SOLDERING TEMPERATURE	1.5mm from case of 1 ~ 3sec./260℃ max.		
	VIBRATION	10 ~ 55Hz, 10G 1min./1cycle, period for 120min. each along X, Y, Z axes		
SAFETY & EMC (Note.5)	SAFETY STANDARDS	UL62368-1, CAN/CSA C22.2 No. 62368-1, LVD EN62368, EAC TP TC 004 approved		
	WITHSTAND VOLTAGE	I/P-O/P:2KVDC		
	ISOLATION RESISTANCE	I/P-O/P:100M Ohms / 500VDC / 25℃/ 70% RH		
	ISOLATION CAPACITANCE (Typ.)	1500pF		
	EMC EMISSION	**Parameter**	**Standard**	**Test Level / Note**
		Conducted	BS EN/EN55032(CISPR32)	Class A/B with external components
		Radiated	BS EN/EN55032(CISPR32)	Class A/B with external components
	EMC IMMUNITY	**Parameter**	**Standard**	**Test Level / Note**
		ESD	BS EN/EN61000-4-2	Level 3, ±6KV contact
		Radiated Susceptibility	BS EN/EN61000-4-3	Level 2, 3V/m
		EFT/Bursts	BS EN/EN61000-4-4	Level 3, 2KV
		Surge	BS EN/EN61000-4-5	Level 3, 2KV Line-Line
		Conducted	BS EN/EN61000-4-6	Level 3, 10V/rms
		Magnetic Field	BS EN/EN61000-4-8	Level 3, 10mA
OTHERS	MTBF	560Khrs MIL-HDBK-217F(25℃)		
	DIMENSION (L*W*H)	25.4*25.4*10mm (1*1*0.39 inch)		
	CASE MATERIAL	Metal		
	PACKING	21g ; 8pcs/per tube, 512pcs/64 tube/per carton		

NOTE

1.All parameters are specified at normal input(F:24Vdc, G:48Vdc), rated load, 25℃ 70% RH ambient.
2.Ripple & noise are measured at 20MHz by using a 12" twisted pair terminated with a 0.1μf & 47μf capacitor.
3.Line regulation is measured from low line to high line at rated load.
4.Load regulation is measured from 0% to 100% rated load.
5.The final equipment must be re-confirm that it still meet EMC directives. For guidance on how to perform these EMC tests, please refer to “EMI testing of component power supplies.”(as available on http://www.meanwell.com)
※ Product Liability Disclaimer ： For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

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■ External Output Trimming

In order to trim the voltage up or down one needs to connect the trim resistor either between the trim pin and -Vo for trim-up and between trim pin and +Vo for trim-down. The output voltage trim range is ±10%. This is shown in Figures 1 and 2:

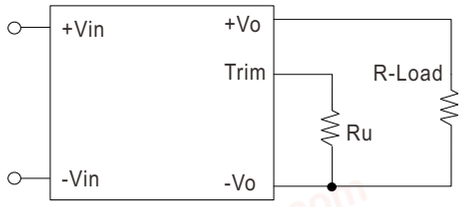


Figure 1. Trim-up Voltage Setup

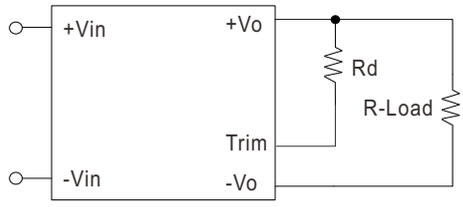


Figure 2. Trim-down Voltage Setup

1. The value of Rtrim-up defined as:

$$R_{trim-up} = \frac{aR2}{R2-a} - R3,\ a = \frac{V_{ref}}{V_o'-V_{ref}} \times R1$$

For example, to trim-up the output voltage of 5.0V module (SKMW40F-05) by 10% to 5.5V, $R_{trim-up}$ is calculated as follows:

V_o' = 5.5V
V_{ref} = 1.24V
R1 = 33.5 KΩ
R2 = 11 KΩ
R3 = 73.2KΩ

$$a = \frac{V_{ref}}{V_o'-V_{ref}} \times R1$$

$$= \frac{1.24}{5.5-1.24} \times 33.5 = 9.75$$

$$R_{trim-up} = \frac{aR2}{R2-a} - R3$$

$$= \frac{9.75 \times 11}{11-9.75} - 73.2$$

$$= \frac{107.25}{1.25} - 73.2$$

$$= 12.6K\Omega$$

Table 1 – Trim up and Trim down Resistor Values

Model No.	Vout	Vref	R1	R2	R3
SKMW40F	3.3V	1.24V	16.7KΩ	10KΩ	52.3KΩ
	5V	1.24V	33.5KΩ	11KΩ	73.2KΩ
	12V	2.5V	38KΩ	10KΩ	48.7KΩ
	15V	2.5V	50.1KΩ	10KΩ	64.9KΩ
	24V	2.5V	86KΩ	10KΩ	73.2KΩ
SKMW40G	3.3V	1.24V	16.7KΩ	10KΩ	52.3KΩ
	5V	1.24V	33.5KΩ	11KΩ	73.2KΩ
	12V	2.5V	38KΩ	10KΩ	48.7KΩ
	15V	2.5V	50.1KΩ	10KΩ	64.9KΩ
	24V	2.5V	86KΩ	10KΩ	73.2KΩ

Note:
1.$R_{trim-up}$, $R_{trim-down}$ is mean trim resistor, please check the formula.
2.a & b: user define parameter, no actual meanings.
3.Vo′ is target trim voltage.
4.Value for R1, R2, R3 and Vref refer to below table.

2. The value of Rtrim-down defined as:

$$R_{trim-down} = \frac{bR1}{R1-b} - R3,\ b = \frac{V_o'-V_{ref}}{V_{ref}} \times R2$$

For example, to trim-down the output voltage of 5.0V module (SKMW40F-05) by 10% to 4.5V, $R_{trim-down}$ is calculated as follows:

V_o' = 4.5V
V_{ref} = 1.24V
R1 = 33.5 KΩ
R2 = 11 KΩ
R3 = 73.2KΩ

$$b = \frac{V_o'-V_{ref}}{V_{ref}} \times R2$$

$$= \frac{4.5-1.24}{1.24} \times 11 = 2.629 \times 11 = 28.919$$

$$R_{trim-down} = \frac{bR1}{R1-b} - R3$$

$$= \frac{28.919 \times 33.5}{33.5-28.919} - 73.2$$

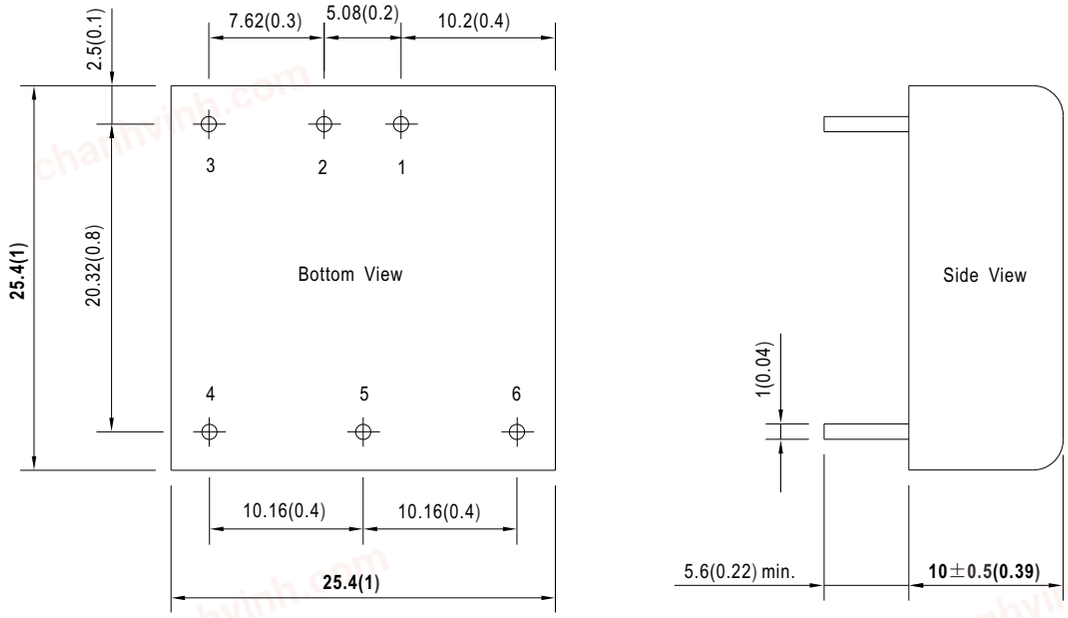
$$= \frac{968.7865}{4.581} - 73.2$$

$$= 138.3K\Omega$$

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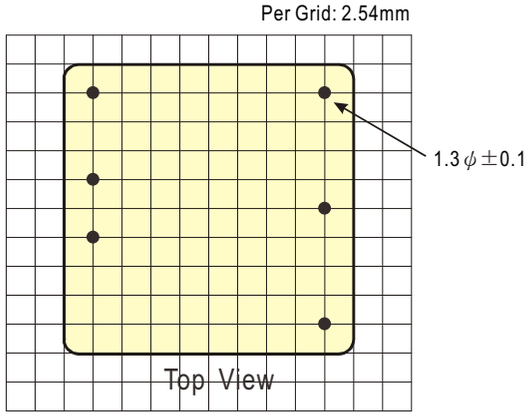
■ Mechanical Specification

- All dimensions in mm(inch)
- Tolerance:x.x±1mm(x.xx±0.25")
- Pin size is 1±0.1mm (0.04"±0.004")



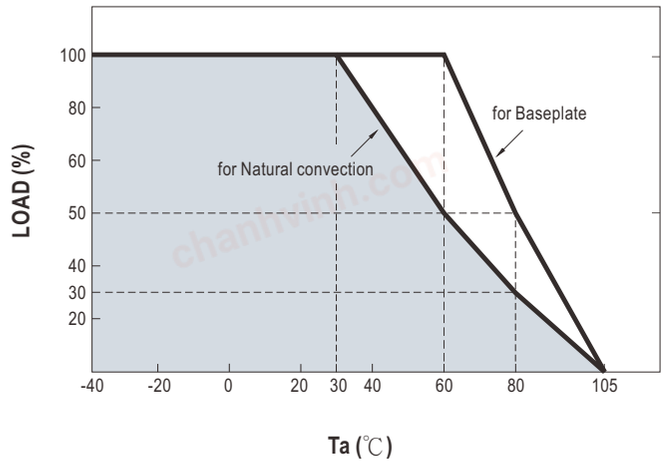
■ Plug Assignment

Pin-Out		
Pin No.	SKMW40 (Single output)	DKMW40 (Dual output)
1	+Vin	+Vin
2	-Vin	-Vin
3	R.C.	R.C.
4	-Vout	-Vout
5	Trim	Common
6	+Vout	+Vout



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Derating Curve



Power Derating Curve

Power module can operate in variety of thermal environments. However, sufficient cooling should be provided to ensure the reliable operation of the unit. Heat can be removed by conduction, convection, and radiation to the surrounding environment.

Figure 3 is the PCB layout, which to measure SKMW40F-05 thermal performed, the dimension is **95.4 * 85 * 1.6mm, 2 OZ**. There copper can help SKMW40F-05 to conduct heat through the body to the PCB.

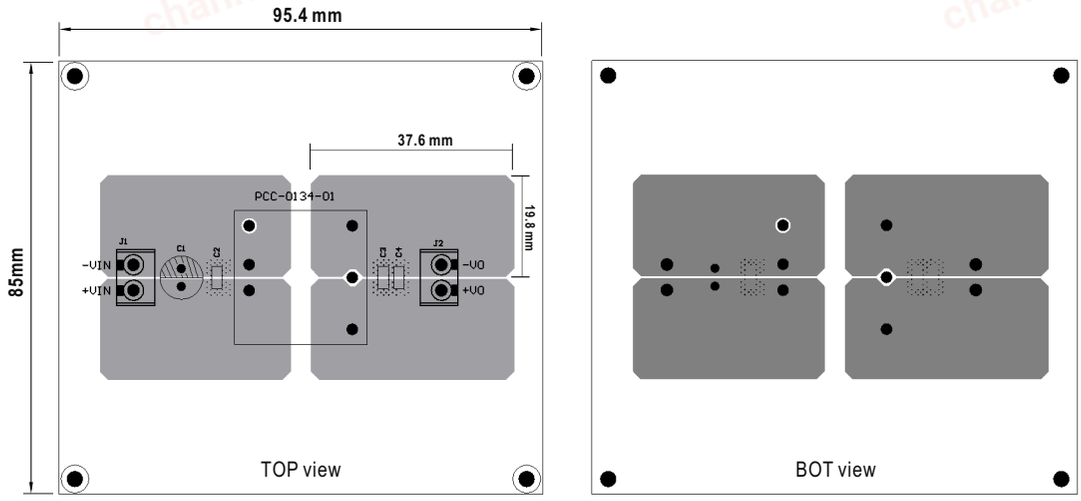
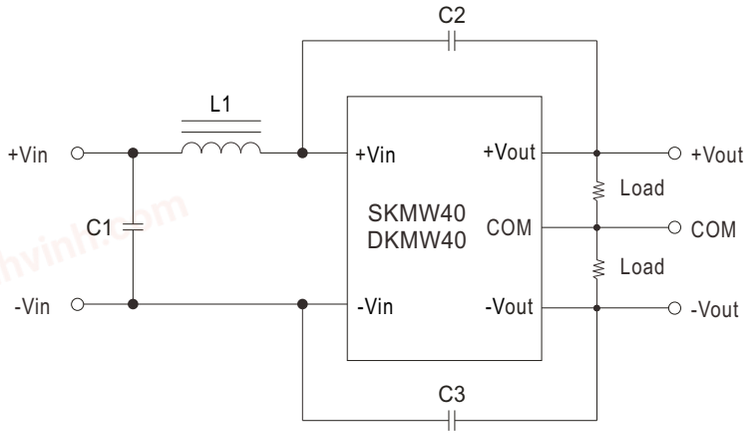


Figure 3

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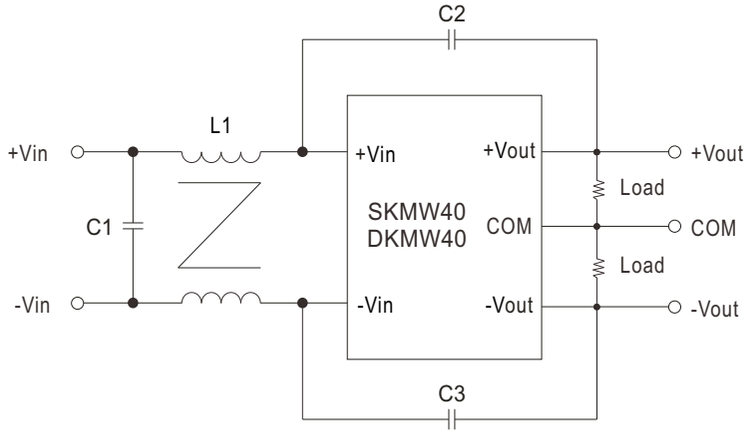
■ EMC Suggest Ciruit

* Required external componets to meet BS EN/EN55032 radiated Class A emission as below:



Models	C1	L1	C2	C3
SKMW40F-03	10μF	2.2μF	NA	2200pF
SKMW40G-03	10μF	2.2μF	2200pF	2200pF
SKMW40F,G-05				
SKMW40F,G-12				
SKMW40F,G-15				
SKMW40F,G-24				
DKMW40F,G-12	10μF	2.2μF	NA	2200pF
DKMW40F,G-15				

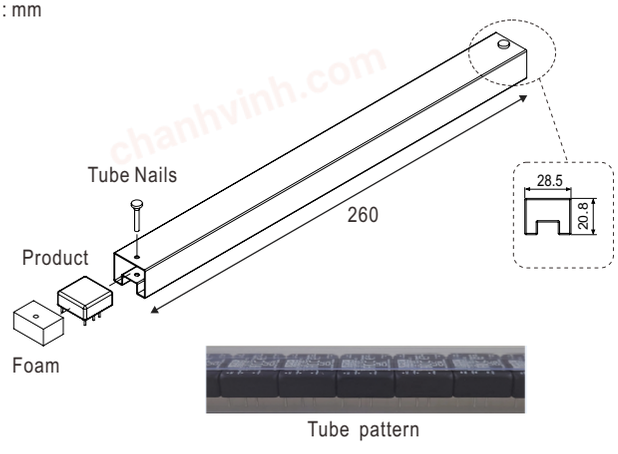
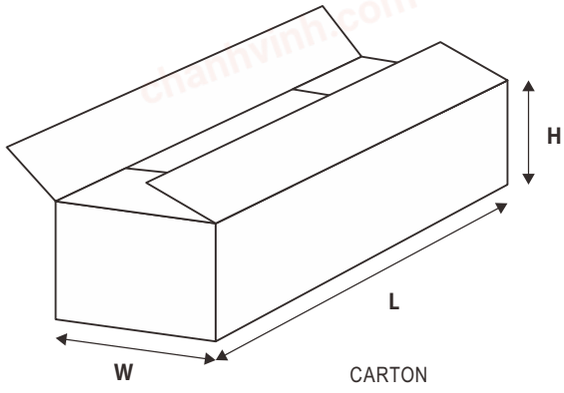
※ EMI Test standard:BS EN/EN55032 Class B Output Conducted & Radiated Emission are as below:



Models	C1	L1	C2	C3
SKMW40F-03	10μF	GSCM121160P-102-2P-AE	2200pF	2200pF
SKMW40G-03				
SKMW40F,G-05	10μF	GSCM121160P-102-2P-AE	6600pF	4400pF
SKMW40F,G-12				
SKMW40F,G-15				
SKMW40F,G-24				
DKMW40F,G-12	10μF	GSCM121160P-102-2P-AE	2200pF	2200pF
DKMW40F,G-15				

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■ Packing

Standard Tube Packing	MPQ Per Tube (PCS)	One Tube G.W.	Max. Q'TY/ Carton(PCS)	One Carton G.W.
Unit : mm  Tube pattern  CARTON L545 x W145 x H220	8	200g	512	13.82Kg

■ Installation Manual

Please refer to : http://www.meanwell.com/manual.html