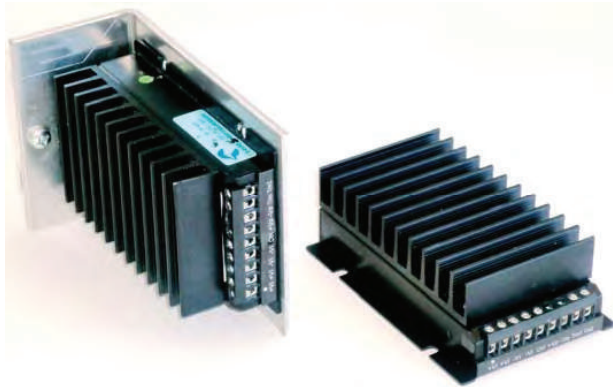


WAF150 SERIES

DC/DC Converter Single Output: 150 Watts



DIN Rail -Option

STD-Panel Mount / HC

Features

- ◆ 4:1 wide Input range: 9~36V, 18~75V & 43~160VDC
- ◆ Single output, up to 12.5A / 150 watts
- ◆ Rail EN50155 compliance
- ◆ High power density package
- ◆ High efficiency up to 88%
- ◆ Regulated output & Short circuit protection
- ◆ 2250VDC isolation
- ◆ Remote ON / OFF, Positive Logic (Negative Logic option)
- ◆ High operating temperature up to +85°C
- ◆ Zero load operation
- ◆ External Output voltage trim
- ◆ Heatsink –HC or DIN Rail Mount option - DN
- ◆ EMC EN55022 Class A (Class B option)

Specifications

Input Voltage	24VDC (9 ~ 36) 48VDC (18 ~ 75) 110VDC (43~160)	Efficiency	Model dependant 86 ~ 88%
Input Filter	Common choke +Pi type	Isolation	Input – Output: 2250VDC Input / Output – Case: 1600VDC
Start-up Voltage	24V input: 8.8V typ. 48V input: 17.6V typ. 110V input: 43V typ.	Isolation Cap.	3500pF
Shutdown Voltage	24V input: 8.2V typ. 48V input: 16.2V typ. 110V input: 36V typ.	Switching Freq.	225-330KHz
Input Surge Voltage. (1 sec)	24V: 50VDC. 48V: 100VDC 110V: 185VDC	Safety	EN60950-1, UL60950-1 EN50155 (with optional filter)
Input Reverse Voltage Protection	Input Parallel Diode External input fuse required	Case Material	Aluminium
Start Up time	Typically 35mS constant resistive load	Base Material	Aluminium
Remote ON/OFF	DC-DC ON Open or $3.0V < V_r < 12V$ DC-DC OFF Short or $0V < V_r < 1.2V$	Potting	Silicon UL94-V0
Positive Logic - Standard		Dimensions	98 x 65 x 35mm (with HC Heatsink)
Negative Logic -Option)	DC-DC ON Short or $0V < V_r < 1.2V$ DC-DC OFF Open or $3.0V < V_r < 12V$	Weight	225g
	Input current of remote control pin: 0.5mA~ 1.0mA Remote off state input current: 3.5mA	MTBF	1.353 x 10 ⁵ Hrs
Output power	150 watts	Operating Temp	-40°C to +85°C (with derating) See derating graphs Note: Unit must be mounted on metal plate fro conduction cooling at maximum power.
Voltage Accuracy	±1.0%	Case Temp	+100°C maximum case temperature
Output Voltage Trim	+0% to +20% External voltage trim	Over Temp. Protection	Shutdown approx 110°C case temperature
Minim Load	Zero	Thermal Impedance	2.73°C / watt without heatsink 2.18°C / watt with optional heatsink
Line Regulation	±0.2% Low line to High Line @ FL	Thermal shock	MIL-STD-810F
Load Regulation	±0.4% No load to Full load	Vibration	MIL-STD-810F
Remote Sense	N/A	Humidity	5-95% RH
Ripple & noise	See table. 20MHZ bandwidth	EMC	EN55022 Class A (see note 6)
Temp. Coefficient	±0.02% / °C	ESD	EN61000-4-2
Transient Response	200uS (25% load step change)	Radiated Immunity	EN61000-4-3
Over Voltage Protection	Set at 125 ~140% of Voltage output nominal. Hiccup type	Fast Transients	EN61000-4-4
Overload Protection	Set at 105 ~ 120% of output current, Constant Current. (note 9)	Surge	EN61000-4-5
Short Circuit protection	Continuous hiccup mode	Conducted Immunity	EN61000-4-6

WAF150 SERIES

DC/DC Converter Single Output: 150 Watts

Model Number	Input Range	Output Voltage	Output Current		Output ⁽³⁾ Ripple & Noise	No load ⁽²⁾ Input Current	Eff ⁽³⁾ (%)	Capacitor ⁽⁴⁾ Load max.
			Min. load	Full load				
WAF150-24S12W-HC	9 ~ 36 V	12 VDC	0mA	12.5 A	100mVp-p	70mA	86	40000µF
WAF150-24S15W-HC	9 ~ 36 V	15 VDC	0mA	10 A	100mVp-p	80mA	86	26000µF
WAF150-24S24W-HC	9 ~ 36 V	24 VDC	0mA	6.3 A	200mVp-p	95mA	87	10000µF
WAF150-24S28W-HC	9 ~ 36 V	28 VDC	0mA	5.4 A	200mVp-p	120mA	87	7600µF
WAF150-24S48W-HC	9 ~ 36 V	48 VDC	0mA	3.2 A	350mVp-p	130mA	86	2600µF
WAF150-48S12W-HC	18 ~ 75 V	12 VDC	0mA	12.5 A	100mVp-p	50mA	87	40000µF
WAF150-48S15W-HC	18 ~ 75 V	15 VDC	0mA	10 A	100mVp-p	60mA	87	26000µF
WAF150-48S24W-HC	18 ~ 75 V	24 VDC	0mA	6.3 A	200mVp-p	60mA	88	10000µF
WAF150-48S28W-HC	18 ~ 75 V	28 VDC	0mA	5.4 A	200mVp-p	70mA	88	7600µF
WAF150-48S48W-HC	18 ~ 75 V	48 VDC	0mA	3.2 A	350mVp-p	70mA	87	2600µF
WAF150-110S12W-HC	43 ~ 160 V	12 VDC	0mA	12.5 A	100mVp-p	25mA	87	40000µF
WAF150-110S15W-HC	43 ~ 160 V	15 VDC	0mA	10 A	100mVp-p	25mA	87	26000µF
WAF150-110S24W-HC	43 ~ 160 V	24 VDC	0mA	6.3 A	200mVp-p	25mA	88	10000µF
WAF150-110S28W-HC	43 ~ 160 V	28 VDC	0mA	5.4 A	200mVp-p	35mA	88	7600µF
WAF150-110S48W-HC	43 ~ 160 V	48 VDC	0mA	3.2 A	350mVp-p	35mA	87	2600µF

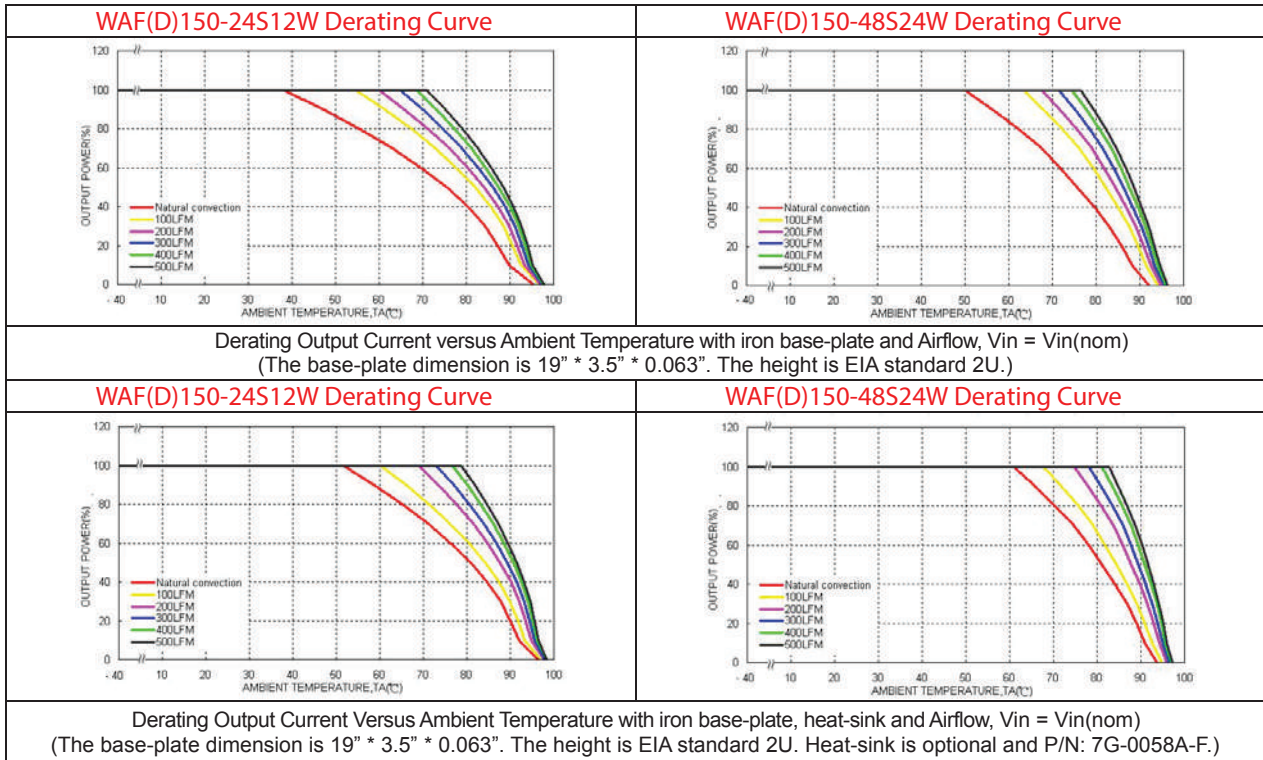
Notes:

- BELLCORE TR-NWT-000332. Case 1: 50% Stress, Temperature at 40°C.
MIL-HDBK-217F Notice2 @Ta=40 °C, Full load , Air Flow = 400LFM (Ground, Benign, controlled environment).
- Typical value at nominal input and no load.
- Typical value at nominal input and full load. (20MHZ BW.)
- Test by minimum input and constant resistive load.
- The CTRL pin voltage is referenced to -VIN. The negative logic is optional.
To order negative logic ON-OFF control adds the suffix -N (Ex: WAF150-24S24W-N).
- The WAF(D)150 series meets EN55022 class A without external components.
- An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5.
The filter capacitor Power Mate suggest: 24VDC input : Nippon chemi-con KY series, 470µF/50V, ESR 45mΩ.
48VDC input : Nippon chemi-con KY series, 220µF/100V, ESR 48mΩ.
110VDC input : Nippon chemi-con KXJ series, 150µF/200V.
- Use a resistor across on the Trim1 and Trim2 to adjust the output voltage.
- The CC Mode is Constant Current Mode and test by nominal input.
- Thermal test at WAF(D)150 mount on metal base-plate. (The base-plate dimension is 19" * 3.5" * 0.063" The height is EIA standard 2U.)
Heat-sink is optional and P/N is "7G-0058A-F".

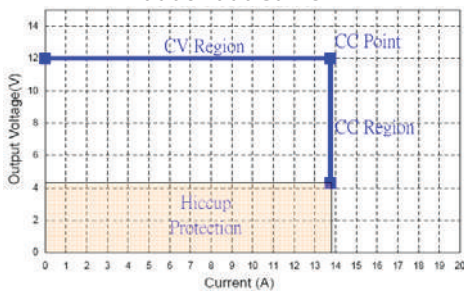
CAUTION: This power module is not internally fused, an input line fuse must always be used. If the load was having sourcing capability (Ex: Battery or Super Capacitor), an output line fuse must always be used.

Part No & Options:

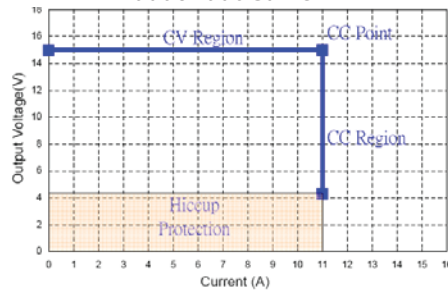
WAF	150	24	S	12	W	N	F	HC
Series Name	Power	Input Voltage	Single Output	Output Voltage	Wide Input	Logic Option	Filter Option	Top Heatsink
WAF	150	24 9-36V		12		- Std	- Std	HC
WAD		48 18-75V	S	12	W	- Std	F Class B	
		110 43-160V		15		N Negative		
				24				
				28				
				48				



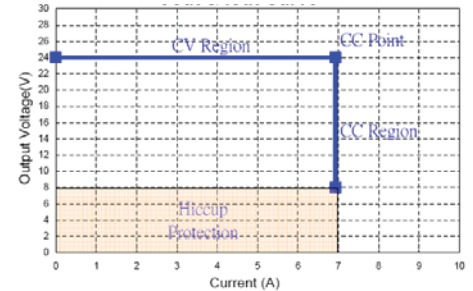
WAF(D)150-xxxS12W
Vout & Iout Curve



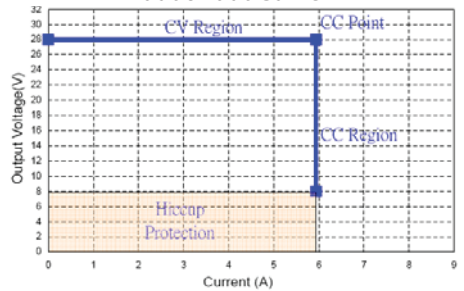
WAF(D)150-xxxS15W
Vout & Iout Curve



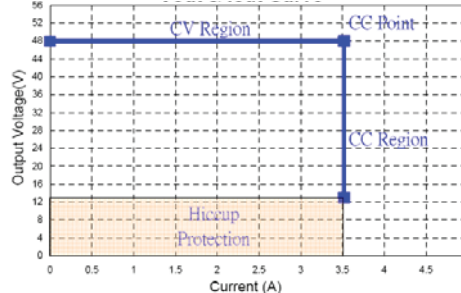
WAF(D)150-xxxS24W
Vout & Iout Curve



WAF(D)150-xxxS28W
Vout & Iout Curve



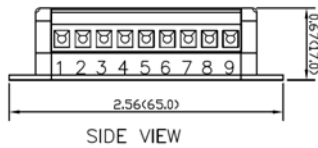
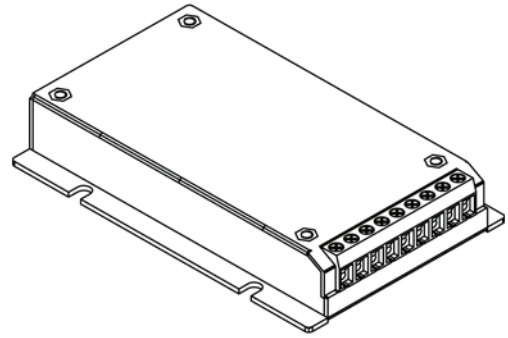
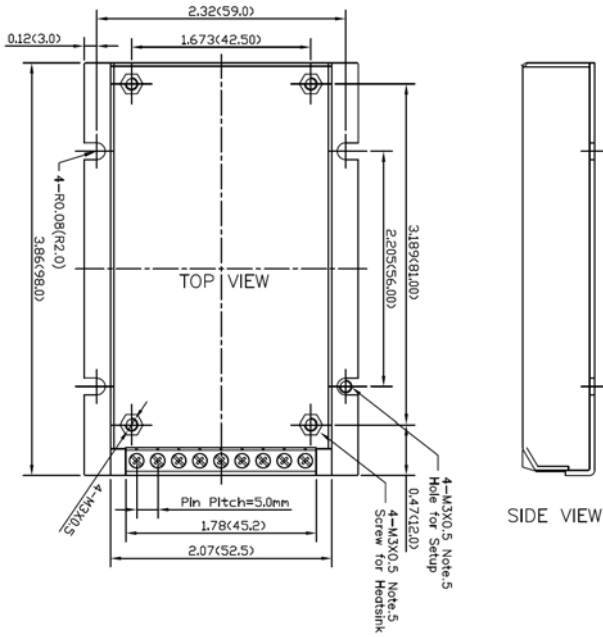
WAF(D)150-xxxS48W
Vout & Iout Curve



Note:

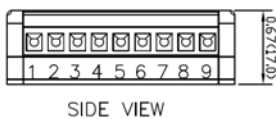
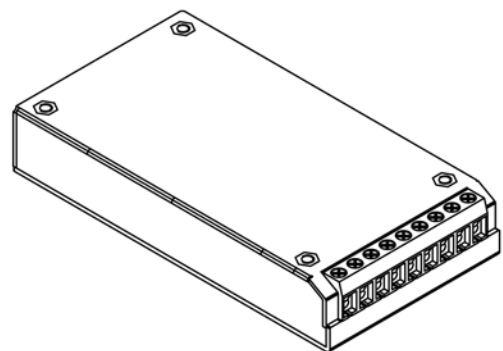
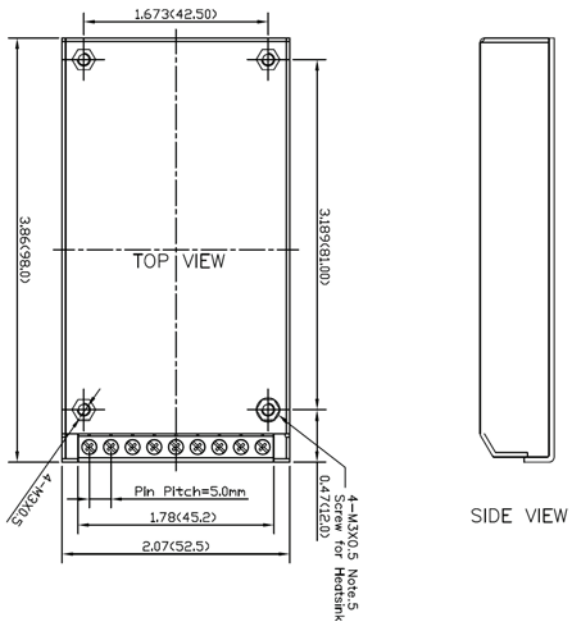
- CV Region: In normal operation. The output current in spec.
Condition: Resistance Load > V_{out} / I_{out} (CC Point)
- CC Region: If the output load current are over rating. The output current will keep in a constant value. And output voltage will fall.
Condition: Resistance Load < V_{out} / I_{out} (CC Point)
- Hiccup Protection: If the output resistance is become short. It will operate in hiccup protection.
Condition: $V_{out} < 4.3V$ (typ.) to Output Short. (WAF(D)150-xxxS12W, WAF(D)150-xxxS15W)
 $V_{out} < 8.0V$ (typ.) to Output Short. (WAF(D)150-xxxS24W, WAF(D)150-xxxS28W)
 $V_{out} < 13V$ (typ.) to Output Short. (WAF(D)150-xxxS48W)

WAF150 dimensions (Standard Model)



- Note: 1.All dimensions in Inches (mm)
 2.Pin pitch tolerance ± 0.25 mm
 3.Tolerance : $x.xx \pm 0.02(x.x \pm 0.5)$
 $x.xxx \pm 0.01(x.xx \pm 0.25)$
 4.Terminal Block Pin Pitch: 5.0mm
 5.The screw locked torque: MAX 0.49N.M (5.0kgf.cm)

WAD150 dimensions (Optional case, without flanges)

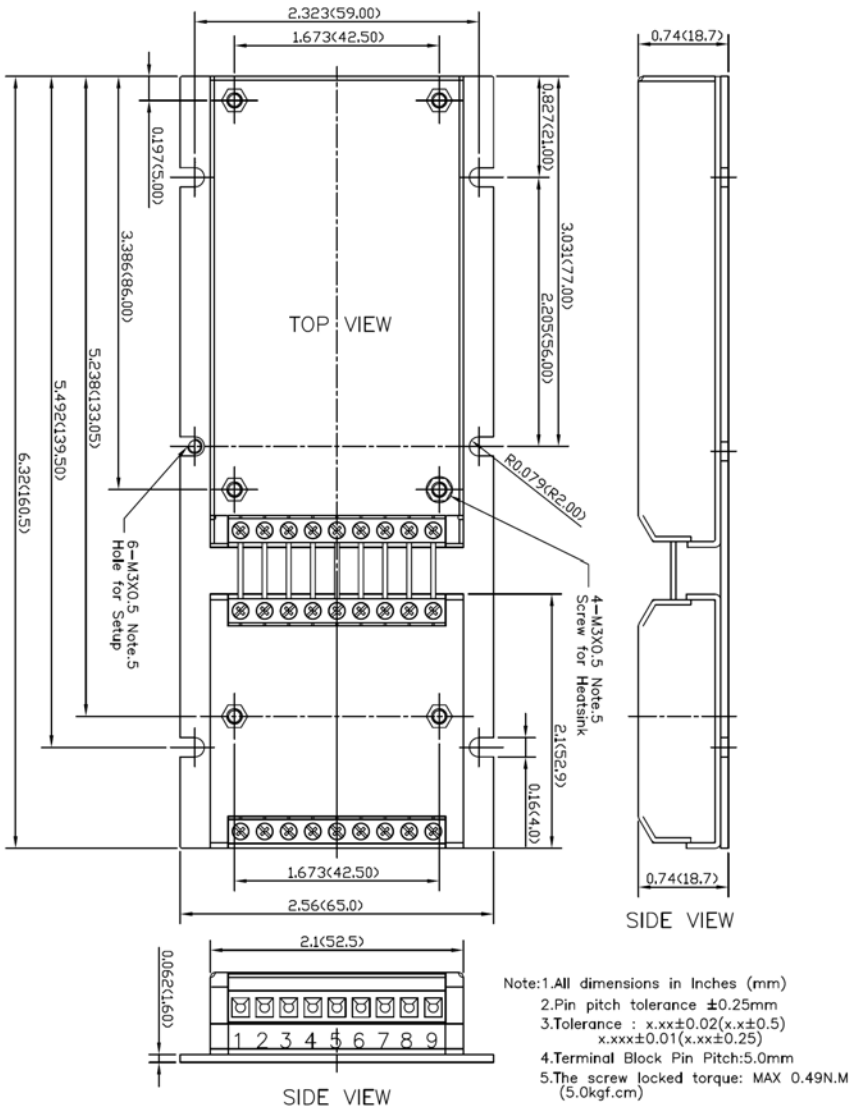


- Note: 1.All dimensions in Inches (mm)
 2.Pin pitch tolerance ± 0.25 mm
 3.Tolerance : $x.xx \pm 0.02(x.x \pm 0.5)$
 $x.xxx \pm 0.01(x.xx \pm 0.25)$
 4.Terminal Block Pin Pitch: 5.0mm
 5.The screw locked torque: MAX 0.49N.M (5.0kgf.cm)

WAF150 SERIES

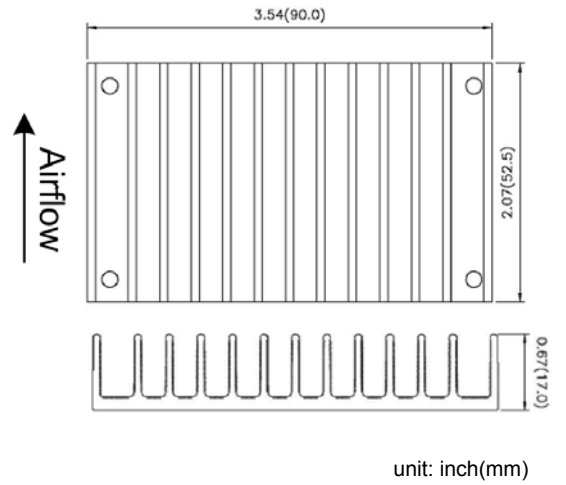
DC/DC Converter Single Output: 150 Watts

WAD150 with meet EN55022 class B Filter Module dimensions



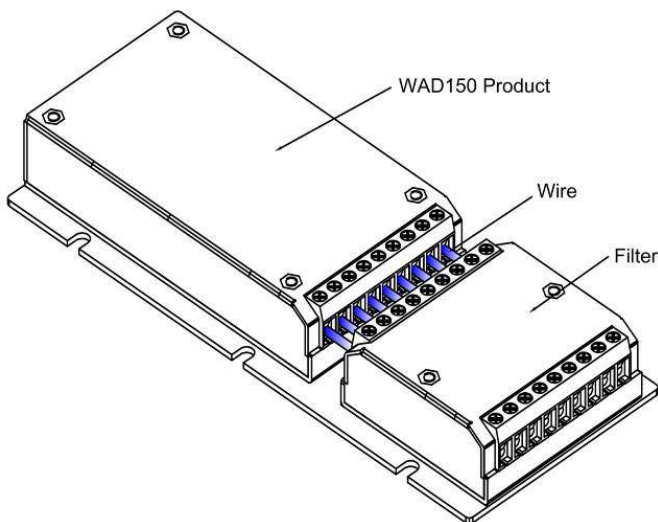
Heat-sink Type: 7G-0058A-F

Suffix:-HC



Pin Connections

PIN	Define	Recommend Matching Wire	Recommend Screwing Torque
1	+VIN	14~16AWG	0.25N.M(2.5kgf.cm)
2	+VIN	14~16AWG	0.25N.M(2.5kgf.cm)
3	-VIN	14~16AWG	0.25N.M(2.5kgf.cm)
4	-VIN	14~16AWG	0.25N.M(2.5kgf.cm)
5	CTRL	14~24AWG	0.25N.M(2.5kgf.cm)
6	+VOUT	14~16AWG	0.25N.M(2.5kgf.cm)
7	-VOUT	14~16AWG	0.25N.M(2.5kgf.cm)
8	TRIM 1	14~24AWG	0.25N.M(2.5kgf.cm)
9	TRIM 2	14~24AWG	0.25N.M(2.5kgf.cm)



External Output V Trim

Output can be externally trimmed by using the method shown below.

