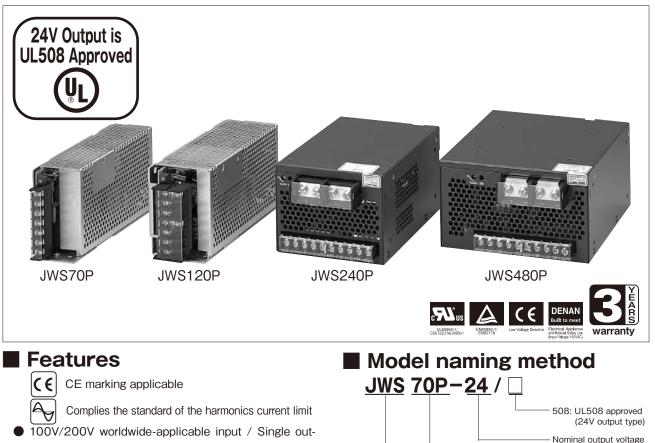
JWS-P SERIES Single Output 70W - 480W



- Applicable to drive systems for FA industry facilities
- Applicable to drive systems for FA industry facilities and medical devices
- Endurable to the peak power of twice the value of nominal output power

Applications



Conformity to RoHS Directive

This means that, in conformity with EU Directive 2002/95/ EC, lead, cadmium, mercury, hexavalent chromium, and specific bromine-based flame retardants, PBB and PBDE, have not been used, except for exempted applications.

Product Line up

Output Voltage	70W		120W		240W		480W	
	Output Current(Peak)	Model	Output Current(Peak)	Model	Output Current(Peak)	Model	Output Current(Peak)	Model
24V	3A(6A)	JWS70P-24	5A(10A)	JWS120P-24	10A(20A)	JWS240P-24	20A(40A)	JWS480P-24
36V					6.65A(13.3A)	JWS240P-36		
48V	1.5A(3A)	JWS70P-48	2.5A(5A)	JWS120P-48	5A(10A)	JWS240P-48	10A(20A)	JWS480P-48

Average output power

Series name

web191203

JWS70P

TDK·Lambda

JWS70P Specifications

ITEMS/	/UNITS MO	DEL	JWS70P-24	JWS70P-48		
	Voltage Range (*3)	V	AC85	- 265		
Input	Frequency (*3)	Hz	47 -	63		
	Power Factor (100/200VAC)(typ) (*4)		0.98 /	0.92		
	Efficiency (typ) (*2)	%	8	0		
	Current (100/200VAC)(typ)(*2) A		1.0 /	0.5		
	Inrush Current (100/200VAC)(typ) A		14 / 28 at Ta=25°C, Cold start			
	Leakage Current (*10)	mA	0.75mA MAX, 0.2mA (typ) at 100VAC / 0.44mA (typ) at 230VAC			
	Nominal Voltage	VDC	24	48		
	Average Current	A	3	1.5		
	Maximum Peak Current (*1)	A	6	3		
	Average Power	W	7.	2		
	Maximum Peak Power (*1)	W	14	4		
Output	Maximum Line Regulation	mV	96	192		
Output	Maximum Load Regulation(*5)	mV	192	384		
	Temperature Coefficient (*6)		Less than	0.02%/°C		
	Maximum Ripple & Noise (0 to +60°C) (*4)	mVp-p	240	480		
	Maximum Ripple & Noise (-10 to 0°C)(*4)	mVp-p	360	720		
	Hold-up Time (typ) (*9)	ms	2	0		
	Voltage Adjustable Range(*4)	VDC	21.6 - 26.4	43.2 - 52.8		
	Over Current Protection (*7)	A	>6.12	>3.06		
	Over Voltage Protection (*8)	VDC	27.6 - 32.4	55.2 - 64.8		
Function	Over Temperature Protection(*11)		Built-in			
Function	Remote Sensing		Poss	Possible		
	Parallel Operation		-	-		
	Series Operation		Poss	Possible		
	Operating Temperature (*12)	°C	-10 to +60 (-10 to +50: 100%, +60: 60%)			
	Storage Temperature	°C	-30 to	-30 to +85		
	Operating Humidity	%RH	30 - 90 (No	o dewdrop)		
Environment	Storage Humidity	%RH	10 - 95 (No	o dewdrop)		
	Vibration		At no operating, 10 ~ 55Hz (sweep for 1mi	n) 19.6 m/s ² constant, X, Y, Z 1hour each.		
	Shock (In package)		Less than	196.1 m/s²		
	Cooling		Convectio	on cooling		
Isolation	Withstand Voltage		Input - FG : 2kVAC (20mA), Input - Output : 3kVAC			
	Isolation Resistance		More than 100MΩ at 25°C and 7	70%RH Output - FG ··· 500VDC		
	Safety Standards (*13)		Approved by UL60950-1, CSA	C22.2 No.60950, EN60950-1.		
Standards			Built to me	et DENAN.		
Januarus	PFHC		Built to meet	EN61000-3-2		
	EMI		Built to meet EN55011/EN55022-A, FCC-ClassA, VCCI-A.			
Mechanical	Weight (typ)	g	70	00		
wechanical	Size (W x H x D)	mm	50 x 92 x 188 (Refe	r to outline drawing)		

(*1) Operating time at peak output is less than 10sec. (Duty<=0.5)

(*2) At 100/200VAC, Ta=25°C and average output power.

(*3) For cases where conformance to various safety specifications (UL, CSA, EN) are required, input voltage range will be 100 - 240VAC (50/60Hz).

(*4) Measure with EIAJ RC-9131 probe, bandwidth of scope: 100MHz.

(*5) 85 - 265VAC, constant load.

(*6) No load - average load, constant input voltage.

- (*7) Constant current limit with automatic recovery.
- (*8) OVP circuit will shut down output, manual reset (line recycle).

(*9) At 100/200VAC nominal output voltage and average output current.

(*10) Measured by the each measuring method of UL, CSA, EN and DENAN (at 60Hz).

(*11) Power supply will recover in case of lower the temperature.

- (*12) Ratings Derating at standard mounting. Load (%) is percent of average output power or average output current, whichever is greater.
 - As for other mountings, refer to derating curve.

(*13) As for DENAN, built to meet at 100VAC.

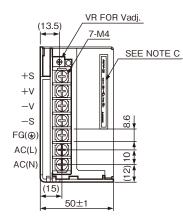
Recommended EMC Filter

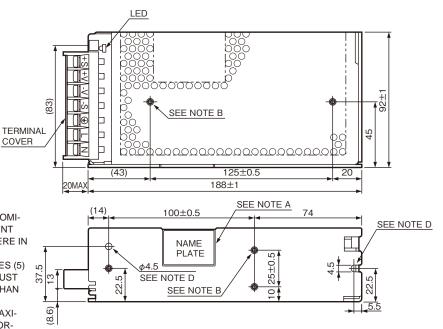


RSEL-2002W Please refer to "TDK-Lambda EMC Filters" catalog.

Outline Drawing

[JWS70P]





NOTES

- A: MODEL NAME, OPTION, INPUT VOLTAGE RANGE, NOMI-NAL OUTPUT VOLTAGE, MAXIMUM OUTPUT CURRENT AND COUNTRY OF MANUFACTURE ARE SHOWN HERE IN ACCORDANCE WITH THE SPECIFICATIONS.
- B: M4 EMBOSSED, TAPPED AND COUNTERSUNK HOLES (5) FOR CUSTOMER CHASSIS MOUNTING. SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 6m/m.
- C: MODEL NAME, NOMINAL OUTPUT VOLTAGE AND MAXI-MUM OUTPUT CURRENT ARE SHOW HERE IN ACCOR-DANCE WITH THE SPECIFICATIONS.
- D: Φ4.5 HOLES (2) FOR CUSTOMER CHASSIS MOUNTING. (USE M4 MOUNTING SCREWS.)

PCB MATERIAL GLASS COMPOSITE : CEM-3(UL94V-0)

ACCESSORIES

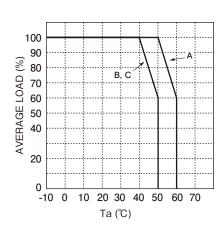
unit: mm

JWS-P

* COVER FOR BARRIER STRIP TERMINAL * SHORT PIECE (NET 2) FOR SHORTING PURPOUSE (+S~+V, -S~-V): MOUNTED AT TIME OF SHIP-

MENT.

Derating Curve



(A) Standard Mounting (B) (C) (D) Prohibited (E) Prohibited

Recommended standard mounting method is (A). Refer to the derating curve. Please do not use installation method (D) and (E). In the derating curve, the nominal output voltage and the average output current is considered to be 100%.

JWS120P

TDK·Lambda

JWS120P Specifications

ITEMS	/UNITS MO	DEL	JWS120P-24	JWS120P-48		
	Voltage Range (*3)		AC85 - 265			
	Frequency (*3)	Hz	47 -	63		
	Power Factor (100/200VAC)(typ)(*2)		0.98 /	0.92		
Input	Efficiency (typ) (*2)		80	0		
-	Current (100/200VAC)(typ) (*2)	Α	1.6 /	0.8		
	Inrush Current (100/200VAC)(typ)		25 / 50 at, Ta=2	5°C, Cold Start		
	Leakage Current (*10)		0.75mA MAX, 0.2mA(typ) at 100	0VAC / 0.44mA(typ) at 230VAC		
	Nominal Voltage	VDC	24	48		
	Average Current	Α	5	2.5		
	Maximum Peak Current (*1)	Α	10	5		
	Average Power	W	12	0		
	Maximum Peak Power (*1)	W	24	0		
<u> </u>	Maximum Line Regulation (*5)	mV	96	192		
Output	Maximum Load Regulation(*6)	mV	192	384		
	Temperature Coefficient		Less than	0.02%/°C		
	Maximum Ripple & Noise (0~+60°C) (*4)	mVp-p	240	480		
	Maximum Ripple & Noise (-10~0°C)(*4)	mVp-p	360	720		
	Hold-up Time (typ) (*9)	ms	20			
	Voltage Adjustable Range	VDC	21.6 - 26.4	43.2 - 52.8		
	Over Current Protection (*7)	Α	10.2 -	5.1 -		
	Over Voltage Protection (*8)	VDC	27.6 - 32.4	55.2 - 64.8		
	Over Temperature Protection(*11)		Buil	t-in		
Function	Remote Sensing		Poss	Possible		
	Parallel Operation		-			
	Series Operation		Possible			
	Operating Temperature (*12)	°C	-10 to +60 (-10 to +5	-10 to +60 (-10 to +50: 100%, +60: 60%)		
	Storage Temperature	°C	-30 to +85			
	Operating Humidity	%RH	30 - 90 (No dewdrop)			
Environment	Storage Humidity	%RH	10 - 95 (No	o dewdrop)		
	Vibration		At no operating, 10 - 55Hz (sweep for 1mi	n) 19.6 m/s ² constant, X, Y, Z 1hour each.		
	Shock (In package)		Less than ²	196.1 m/s²		
	Cooling		Convectio	n Cooling		
	Withstand Voltage		Input - FG : 2kVAC (20mA), Input - Output : 3kVAC	(20mA), Output - FG : 500VAC (100mA) for 1min		
Isolation	Isolation Resistance		More than 100MΩ at 25°C and 7	More than 100M Ω at 25°C and 70%RH Output - FG \cdots 500VDC		
			Approved by UL60950-1, CSA C	C22.2 No.60950-1, EN60950-1.		
	Safety Standards (*13)		Built to mee	et DENAN.		
Standards	PFHC		Built to meet B	Built to meet EN61000-3-2		
H	EMI		Built to meet EN55011/EN550	22-A, FCC-ClassA, VCCI-A.		
Mechanical	Weight (typ)	g	90	0		
	Size (W x H x D)	mm	65 x 92 x 198 (Refer	to outline drawing)		

(*1) Operating time at peak output is less than 10sec. (Duty<=0.5)

(*2) At 100/200VAC, Ta=25 $^\circ\!C$ and average output power.

(*3) For cases where conformance to various safety specifications (UL, CSA, EN) are required, input voltage range will be 100 - 240VAC (50/60Hz).

(*4) Measure with JEITA RC-9131 probe, bandwidth of scope: 100MHz.

(*5) 85 - 265VAC, constant load.

(*6) No load - average load, constant input voltage.

(*7) Constant current limit with automatic recovery.

(*8) OVP circuit will shut down output, manual reset (line recycle).

(*9) At 100/200VAC nominal output voltage and average output current.

(*10) Measured by the each measuring method of UL, CSA, EN and DENAN (at 60Hz).

(*11) Power supply will recover in case of lower the temperature.

(*12) Ratings - Derating at standard mounting.

Load (%) is percent of average output power or average output current, whichever is greater.
 As for other mountings, refer to derating curve.

(*13) As for DENAN, built to meet at 100VAC.

Recommended EMC Filter

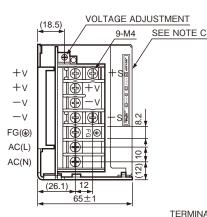


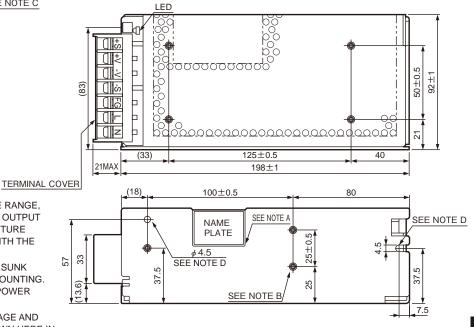
RSEL-2002W Please refer to "TDK-Lambda EMC Filters" catalog.

JWS-P

Outline Drawing

[JWS120P]





NOTES

- A: MODEL NAME, OPTION, INPUT VOLTAGE RANGE, NOMINAL OUTPUT VOLTAGE, MAXIMUM OUTPUT CURRENT AND COUNTRY OF MANUFACTURE ARE SHOWN HERE IN ACCORDANCE WITH THE SPECIFICATIONS.
- B: M4 EMBOSSED, TAPPED AND COUNTERSUNK HOLES (7) FOR COSTOMER CHASSIS MOUNTING. SCREWS MUST NOT PROTRUDE INTO POWER SUPPLY BY MORE THAN 6m/m.
- C: MODEL NAME, NOMINAL OUTPUT VOLTAGE AND MAXIMUM OUTPUT CURRENT ARE SHOWN HERE IN ACCORDANCE WITH THE SPECIFICATIONS.
- D: Φ4.5 HOLES (2) FOR CUSTOMER CHASSIS MOUNTING. (USE M4 MOUNTING SCREWS.)

PCB MATERIAL

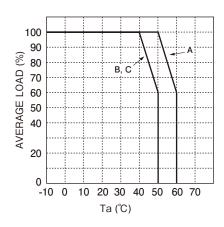
GLASS COMPOSITE : CEM-3(UL94V-0)

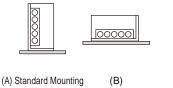
ACCESSORIES

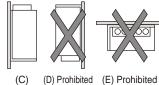
* COVER FOR BARRIER STRIP TERMINAL.

- * SHORT PIECE (NET 2) FOR SHORTING PURPOUSE
- (+S \sim +V, -S \sim -V):MOUNTED AT TIME OF SHIPMENT.

Derating Curve







Recommended standard mounting method is (A). Refer to the derating curve. Please do not use installation method (D) and (E). In the derating curve, the nominal output voltage and the average output current is considered to be 100%.

unit: mm

JWS240P

TDK·Lambda

JWS240P Specifications

ITEMS/	/UNITS MOI	DEL	JWS240P-24	JWS240P-36	JWS240P-48		
	Voltage Range (*3)	V	AC85 - 265				
Input	Frequency (*3)	Hz		47 - 63			
	Power Factor (100/200VAC)(typ)(*2)			0.99 / 0.95			
	Efficiency (typ) (*2)			80			
	Current (100/200VAC)(typ)(*2)	Α		3.2 / 1.6			
	Inrush Current (100/200VAC)(typ)(*4)	Α		20 / 40			
	Leakage Current (*11)	mA	0.75mA MAX, 0.2	2mA(typ) at 100VAC / 0.44m	A(typ) at 230VAC		
	Nominal Voltage	VDC	24	36	48		
	Average Current	A	10	6.65	5		
	Maximum Peak Current (*1)	A	20	13.3	10		
	Average Power	W	240	239.4	240		
	Maximum Peak Power (*1)	W	480	478.8	480		
Output	Maximum Line Regulation (*6)	mV	96	144	192		
Output	Maximum Load Regulation(*7)	mV	192	288	384		
	Temperature Coefficient			Less than 0.02%/°C			
	Maximum Ripple & Noise (0~+65°C)(*5)	mVp-p	240	360	480		
	Maximum Ripple & Noise (-10~0°C) (*5)	mVp-p	360	540	720		
	Hold-up Time (typ) (*10)	ms		20			
	Voltage Adjustable Range	VDC	21.6 - 28.8	32.4 - 43.2	43.2 - 52.8		
	Over Current Protection (*8)	Α	>20.4	>13.7	>10.2		
	Over Voltage Protection (*9)	VDC	30.0 - 34.8	45.0 - 52.2	55.2 - 64.8		
	Remote Sensing			Possible			
Function	Remote ON/OFF Control		Possible				
	Parallel Operation						
	Series Operation			Possible			
	Monitoring Signal			PF (Open collector output)			
	Operating Temperature (*12)	°C	-10 to +65 (-10 to +50: 100%, +60: 70%,	+65: 55%)		
	Storage Temperature	°C		-30 to +85			
	Operating Humidity	%RH		30 - 90 (No dewdrop)			
Environment	Storage Humidity	%RH	10 - 95 (No dewdrop)				
	Vibration		At no operating, 10 - 55Hz	(sweep for 1min) 19.6 m/s ² co	onstant, X, Y, Z 1hour each.		
	Shock (In package)			Less than 196.1m/s ²			
	Cooling			Forced Air By Blower Fan			
	With stand Valtage		Input - FG:2kVAC(20mA), Input - Output:3kVAC (20mA),				
lociation	Withstand Voltage		Output - FG:500VAC(100mA), Output-CNT:100VAC(100mA) for 1min.				
Isolation	Indiction Desistance		More than 100MΩ Output - FG ··· 500VDC				
ľ	Isolation Resistance		More than 10M Ω Output - CNT \cdots 100VDC at 25°C and 70%RH				
	Safety Standards (*13)		Approved by UL60950-1, C	SA C22.2 No.60950, EN609	50-1. Built to meet DENAN.		
Standards	PFHC		Built to meet EN61000-3-2				
	EMI		Built to meet EN55011/EN55022-A, FCC-ClassA, VCCI-A.				
Mechanical	Weight (typ)	g	1900				
wechanical	Size (W x H x D)	mm	120 x 9	92 x 190 (Refer to outline dra	awing)		

(*1) Operating time at peak output is less than 10sec. (Duty<=0.5)

(*2) At 100/200VAC, Ta=25 $^\circ\!C$ and average output power.

(*3) For cases where conformance to various safety specifications (UL, CSA, EN) are required, input voltage range will be 100 - 240VAC (50/60Hz).

(*4) First in-rush current. Not applicable for the in-rush current to noise filter less than 0.2ms.

(*5) Measure with JEITA RC-9131 probe, bandwidth of scope :100MHz.

(*6) 85 - 265VAC , constant load.

(*7) No load - Average load, constant input voltage.

(*8) Constant current limit with automatic recovery.

(*9) OVP circuit will shut down output, manual reset (line recycle).

(*10) At 100/200VAC nominal output voltage and average output current.

(*11) Measured by the each measuring method of UL, CSA, EN and DENAN (at 60Hz).

(*12) Ratings - Derating at standard mounting.

Load (%) is percent of average output power or average output current, whichever is greater.
 As for other mountings, refer to derating curve.

(*13) As for DENAN, built to meet at 100VAC.

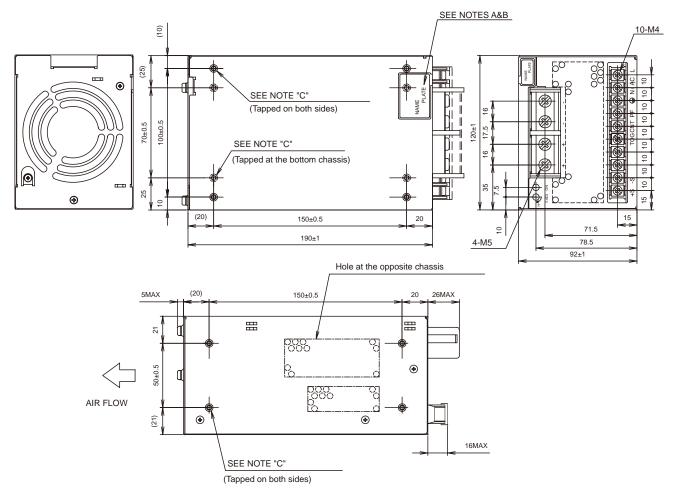
Recommended EMC Filter



RSEL-2006W Please refer to "TDK-Lambda EMC Filters" catalog.

Outline Drawing

[JWS240P]



PCB MATERIAL

GLASS COMPOSITE : CEM-3 (UL94V-0)

ACCESSORIES

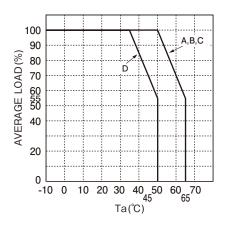
- Cover for barrier terminal strip ------ 2
- (Mounted on terminal strip at time of shipment.)
- * Metal piece for shorting TOG & CNT --
- (Mounted on terminal strip at time of shipment.) --- 2
- * Sensing wire ------
- (BROWN: + . BLUE: -)

NOTES

- A: Model name, nominal output voltage and maximum output current are shown here in accordance with the specifications.
- B: Country of manufacture will be shown here.
- C: M4 tapped holes (20) for customer chassis mounting. Screws must not protrude into power supply by more than 6m/m.

unit:mm

Derating Curve



00. 00 0000 0000 00.00 ğ (A) Standard Mounting (C) (E) Prohibited (F) Prohibited (B) (D)

Recommended standard mounting method is (A). Refer to the derating curve. Please do not use installation method (E) and (F). In the derating curve, the nominal output voltage and the average output current is considered to be 100%.

JWS480P

TDK·Lambda

JWS480P Specifications

ITEMS/	/UNITS MOI	DEL	JWS480P-24	JWS480P-48		
	Voltage Range (*3)	V	AC85	- 265		
	Frequency (*3)	Hz	47	- 63		
	Power Factor (100/200VAC)(typ) (*2)		0.99	/ 0.95		
Input	Efficiency (typ) (*2)		8	0		
	Current (100/200VAC)(typ)(*2)		6.4	/ 3.2		
	Inrush Current (100/200VAC)(typ)(*4)		20	/ 40		
	Leakage Current (*11) r		0.75mA MAX, 0.25mA(typ) at 1	00VAC / 0.57mA(typ) at 230VAC		
	Nominal Voltage	VDC	24	48		
	Average Current	Α	20	10		
	Maximum Peak Current (*1)	Α	40	20		
	Average Power	W	41	80		
	Maximum Peak Power (*1)	W	90	60		
	Maximum Line Regulation (*6)	mV	96	192		
Output	Maximum Load Regulation(*7)	mV	192	384		
	Temperature Coefficient		Less than	0.02%/°C		
	Maximum Ripple & Noise (0~+60°C)(*5)	mVp-p	240	480		
	Maximum Ripple & Noise (-10~0°C) (*5)	mVp-p	360	720		
	Hold-up Time (typ) (*10)	ms	2	20		
	Voltage Adjustable Range	VDC	21.6 - 28.8	43.2 - 52.8		
	Over Current Protection (*8)	Α	>40.8	>20.4		
	Over Voltage Protection (*9)	VDC	30.0 - 34.8	55.2 - 64.8		
	Remote Sensing		Possible			
Function	Remote ON/OFF Control		Possible			
	Parallel Operation			-		
	Series Operation		Possible			
	Monitoring Signal		PF (Open Co	llector Output)		
	Operating Temperature (*12)	°C	-10 to +65 (-10 to +50: 10	00%, +60: 70%, +65: 55%)		
	Storage Temperature	°C	-30 t	-30 to +85		
	Operating Humidity	%RH	30 - 90 (N	o dewdrop)		
Environment	Storage Humidity	%RH	10 - 95 (N	10 - 95 (No dewdrop)		
	Vibration		At no operating, 10 ~ 55Hz (sweep for 1m	in) 19.6 m/s ² constant, X, Y, Z 1hour each.		
	Shock (In package)		Less than	196.1 m/s ²		
	Cooling		Forced air b	y blower fan		
	Mither and Malter an		Input - FG:2kVAC(20mA), In	put - Output:3kVAC (20mA),		
	Withstand Voltage		Output - FG:500VAC(100mA), Out	put-CNT:100VAC(100mA) for 1min.		
Isolation	Isolation Resistance		More than 100MΩ Output - FG ··· 500VDC More than 10MΩ Output - CNT ··· 100VDC at 25°C and 70%RH			
Oten la l	Safety Standards (*12)		Approved by UL60950-1, CSA C22.2 No.60950-1, EN60950-1, Built to meet DENAN.			
Standards	PFHC		Built to meet EN61000-3-2			
ŀ	EMI		Built to meet EN55011/EN55	022-A, FCC-ClassA, VCCI-A.		
Mechanical	Weight (typ)	g	30	00		
	Size (W x H x D)	mm	160 x 92 x 200 (Refe	er to outline drawing)		

(*1) Operating time at peak output is less than 10sec. (Duty<=0.5)

(*2) At 100/200VAC, Ta=25°C and average output power.

(*3) For cases where conformance to various safety specifications (UL, CSA, EN) are required, input voltage range will be 100 ~ 240VAC (50/60Hz).

(*4) First in-rush current. Not applicable for the in-rush current to noise filter less than 0.2ms.

(*5) Measure with JEITA RC-9131 probe, bandwidth of scope :100MHz.

(*6) 85 ~ 265VAC, constant load.

(*7) No load - Average load, constant input voltage.

(*8) Constant current limit with automatic recovery. Peak current conditions more than 10 seconds could result to shut down the output voltage.

(*9) OVP circuit will shut down output, manual reset (line recycle).

(*10) At 100/200VAC nominal output voltage and average output current.

(*11) Measured by the each measuring method of UL, CSA, EN and DENAN (at 60Hz).

(*12) Ratings - Derating at standard mounting.

Load (%) is percent of maximum output power or averge output current, whichever is greater.
 As for other mountings, refer to derating curve.

(*13) As for DENAN, built to meet at 100VAC.

JWS-P

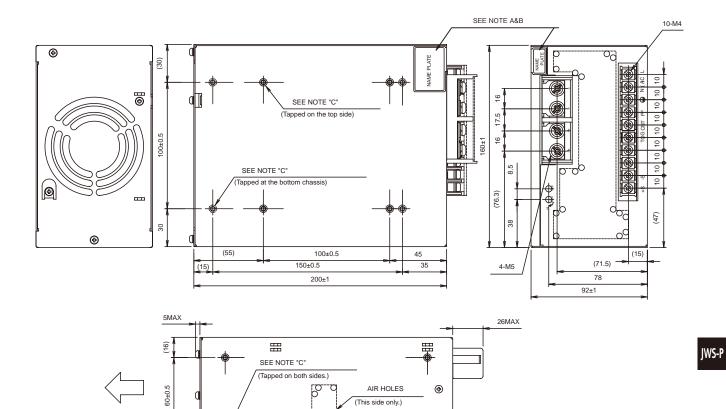
-1 _

Recommended EMC Filter

RSEN-2010 Please refer to "TDK-Lambda EMC Filters" catalog.

Outline Drawing

[JWS480P]



PCB MATERIAL GLASS COMPOSITE : CEM-3(UL94V-0)

ACCESSORIES

Cover for barrier terminal strip ----- 2 (Mounted on terminal strip at time of shipment.)

AIR FLOW

٩

(20)

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- Metal piece for shorting TOG & CNT ------ 1 (Mounted on terminal strip at time of shipment.) 2
- Sensing wire (BROWN: + . BLUE: -)

NOTES

h

160±0.5

A: Model name, nominal output voltage and maximum output

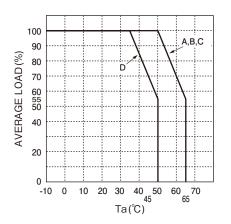
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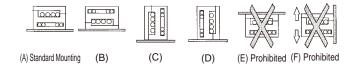
20

- current are shown here in accordance with the specifications.
- B: Country of manufacture will be shown here.
- C: M4 tapped holes (16) for costomer chassis mounting. Screws must not protrude into power supply
 - by more than 6m/m.

unit: mm

Derating Curve

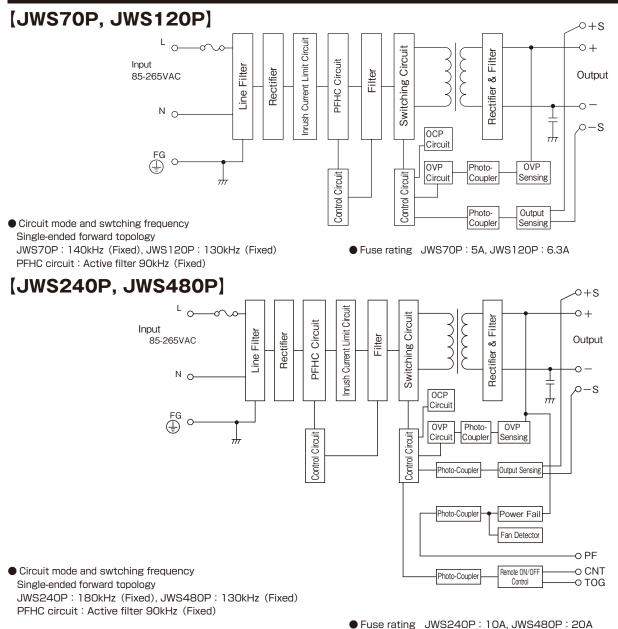




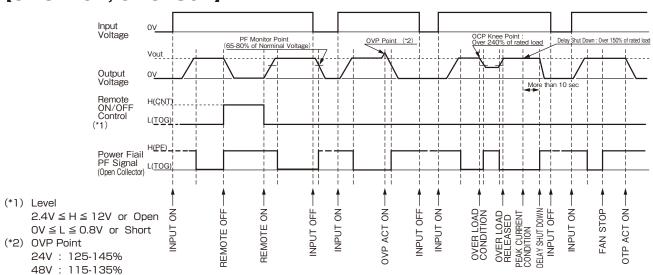
18MAX

Recommended standard mounting method is (A). Refer to the derating curve. Please do not use installation method (E) and (F). In the derating curve, the nominal output voltage and the average output current is considered to be 100%.

Block Diagram



Sequence Time Chart



[JWS240P, JWS480P]

JWS70P, 120P Instruction Manual

● JWS240P, 480P Instruction Manual (→ A-213Page

BEFORE USING THE POWER SUPPLY UNIT

Pay attention to all warnings and cautions before using the unit. Incorrect usage could lead to an electric shock, damage to the unit or a fire hazard.

WARNING and CAUTION ∕₽

- Do not modify nor remove cover.
- Do not touch the internal components, they may have high voltage or high temperature.
 - You may get electric shock or burned.
- When the unit is operating, keep your hands and face away from it, you may get injured by an accident.
- This power supply is primarily designed and manufactured to be used and enclosed in other equipment. Stick the WARN-ING label for users on the system equipment and describe the notice in the instruction manual.

- Never operate the unit under over current or shorted conditions for long time, which could result in damage or insulation failure. There is no possibility for fire or burning.
- Confirm connections to input/output terminals are correct as indicated in the instruction manual.
- This power supply has a possibility that hazardous voltage may occur in output terminal depending on failure mode. The outputs of these products must be earthed in the end use equipment to maintain SELV.

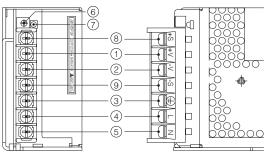
If the outputs are not earthed, they must be considered hazardous and must not be made user accessible.

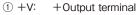
Note : CE MARKING

CE Marking, when applied to a product covered by this handbook, indicates compliance with the low voltage directive (73/23/EEC) as modified by the CE Marking Directive (93/68/ EEC) which complies with EN60950.

1. Terminal Explanation

JWS70P



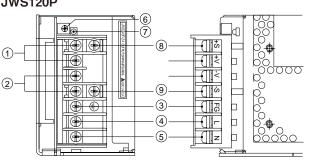


2) −V: -Output terminal

3 FG 3: Frame Ground (Safety Earth)

- 4) L: Input terminal Live line (Fuse in line)
- (5) N: Input terminal Neutral line

JWS120P



6 Output voltage adjustment trimmer

- ⑦ Output monitoring indicator (Green LED)
- ⑧ +S: +Remote sensing terminal
- (9) -S: -Remote sensing terminal

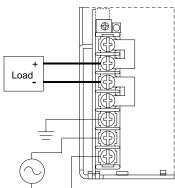
2. Terminal Connecting Method

- Input must be off when making connection.
- Connect 🖶 terminal to ground terminal of the equipment

JWS70P

Basic connection (Local sensing)

Connect "+S" terminal to "+V" terminal and "-S" terminal to "-V" terminal with the attached short pieces.

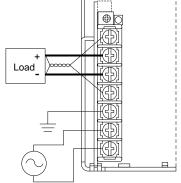


- The output load line and input line shall be separated and twisted to improve noise sensitivity.
- Remote sensing lines shall be twisted or use shielded wire.

Remote sensing required

Connect "+S" terminal to "+" terminal of load and "-S" terminal to "-" terminal of load with wires.

When remote sensing terminals are opened, output is shut down.

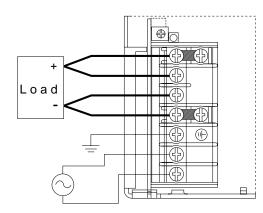


JWS 70P, 120P

JWS120P

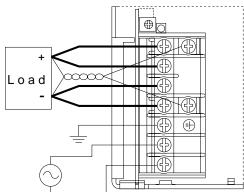
Basic connection (Local sensing)

Connect "+S" terminal to "+V" terminal, and "-S" terminal to "-V" terminal with the attached short pieces.



Remote sensing required

Connect "+S" terminal to "+" terminal of load and "-S" terminal to "-" terminal of load with wires. When remote sensing terminals are opened, output is shut down.



3. Explanation of Functions and Precautions

Input Voltage Range

Input voltage range is single phase 85-265VAC (47-63Hz). Input voltage which is out of specification may cause unit damage.

2 Output Voltage Range

V.ADJ trimmer on the front panel side can adjust the output voltage within the range. Output voltage range is within +/-10% of nominal output voltage. To turn the trimmer clockwise, the output voltage will be increased. Note over voltage protection (OVP) function may trigger if the output voltage is increased excessively.

3 Inrush Current

This series has used Power Thermistor to protect the circuit from Inrush Current. Please carefully select input switch and fuse in cases of the high temperature and re-input the power.

4 Over Voltage Protection (OVP)

The OVP function (inverter shut down method, manual reset type) is provided. When OVP triggers, the output will be shut down. The input shall be removed for a few minutes, and then re-input for recovery of the output. OVP setting shall be fixed and not to be adjusted externally.

Over Current Protection (OCP)

Constant current limiting, automatic recovery. OCP function operates when the output current exceeds 204% of average output current on specification. The output will be automatically recovered when the overload condition is canceled. Never operate the unit under over current or shorted conditions for a long time, which could result in damage.

6 Over Temperature Protection (OTP)

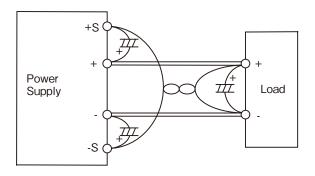
Over temperature protection function (automatic recovery) is provided. When ambient or internal temperature rises abnormally, OTP will shut down the output. The output will automatically recover if the over temperature condition is canceled.

7 Remote Sensing (+S, -S terminal)

This function compensates voltage drop of wiring from output terminals to load terminals. Connect "+S" terminal to "+" terminal of load and "-S" terminal to "-" terminal of load with sensing wires. The total line voltage drop (+ side line and - side line) shall be less than 0.3V. In case that sensing line is too long, it is necessary to put an electrolytic capacitor in following 3 places;

- 1) Across the load terminal,
- 2) Between "+S" terminal and "+" terminal,
- 3) Between "-S" terminal and "-" terminal.

If remote sensing terminals are opened, the output will rise and OVP may be triggered.

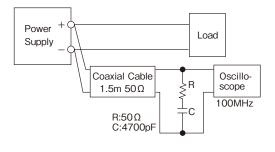


8 Output Ripple & Noise

The standard specification for maximum ripple value is measured according to measurement circuit specified by JEITA-RC9131. When load lines are longer, ripple becomes larger. In this case, electrolytic capacitor, film

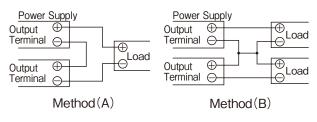
JWS 70P, 120P

capacitor, etc., might be necessary to use across the load terminal. The output ripple cannot be measured accurately if the probe ground lead of oscilloscope is too long.



Series Operation

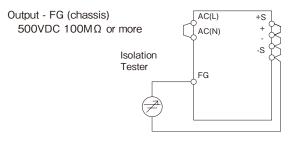
For series operation, either method (A) or (B) is possible.



4. Isolation/Withstand Voltage Isolation Test

Isolation Test

Isolation resistance between output and FG (chassis) shall be more than $100M\Omega$ at 500VDC. For safety operation, voltage setting of DC isolation tester must be done before the test. Ensure that it is fully discharged after the test.



2 Withstand Voltage

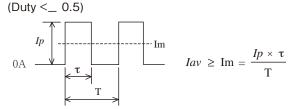
This series is designed to withstand 3.0kVAC between input and output, 2.0kVAC between input and FG (chassis), and 500VAC between output and FG (chassis), each for 1 minute. When testing withstand voltage, set current limit of withstand voltage test equipment at 20mA (Output-FG (chassis): 100mA). The applied voltage must be gradually increased from zero to testing value and then gradually decreased for shut down. When timer is used, the power supply may be damaged by high impulse voltage at timer switch on and off. Connect input and output as follows.

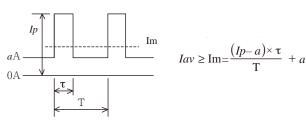
Input - Output (dotted line) AC(L) 3kVAC 1min. (20mA) AC(N Input - FG (chassis) (solid line) 2kVAC 1min. (20mA) FG Withstand Voltage Tester Output - FG (chassis) +S AC(L) 500VAC 1min. (100mA) AC(N) FG Withstand

Voltage Tester

5. Peak Output Current

For JWS-P series, relation with average output current and peak output current must satisfy formulas below. Also operating time at peak output is less than 10sec.





Ip: Peak output current (A)

- lav: Average output current of specification (A)
- Im: Average output current (A)
- τ : Pulse width of peak output current (sec)
 (Operating time at peak output)
- T: Period (sec)

6. Mounting Directions

1 Output Derating according to the Mounting Directions

Recommended standard mounting method is (A). Method (B) and

(C) are also possible. Refer to the derating below. Please do not use installation method (D) and (E), where the PCB will be on the topside and heat will be trapped inside the unit. In the following derating

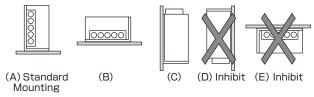
JWS 70P, 120P

TDK·Lambda

15mm or more 15mm or more

Provide punching, etc. to allow air to pass.

curve, the average output current is considered to be 100% .



Output Derating

100 (% 00) 00) 00) 00) 00) 00) 00) 00	Ta (°C
	-10 to +
	45
A Vera	50
	55
-10 0 10 20 30 40 50 60 Ambient Temperature (
Ambient remperature (0)

JWS70P, JWS120P Output Derating						
T= (°O)	AVERAGE LOAD (%)					
Ta (°C)	А	В	С			
-10 to +40	100	100	100			
45	100	80	80			
50	100	60	60			

_

80

60

2 Mounting Method

- (1) This is convection cooling type power supply. In the consideration for the heat radiation and safety. Please take a distance more than 15mm between the power supply and the peripheral parts. When lining up mul-
- The output load line and input line shall be separated and twisted to improve noise sensi-tivity.
- The sensing lines shall be twisted and separted from the output lines.
- Use all lines as thick and short as possible to make lower impedance.
- Noise can be eliminated by attaching a capacitor to the load terminals.
- 7. Wiring Method
 - For safety and EMI considerations, connect FG to the mounting set ground terminal.

tiple units, please make sure to place them 15mm or

(2) The maximum allowable penetration of mounting

JWS70P,120P(M4 screw) : 1.27 N·m (13.0kgf·cm)

3 Optional sheet metal parts for mounting Optional sheet metal mounting parts are available to meet

following mounting methods. Contact to Densei-Lambda

more apart from each other.

Air flow

Sheet Metal

(3) Recommended torque for mounting screw

screws is 6mm.

个个

sales representatives.

- Recommended torque for the terminal piece : JWS70P, 120P (M4 screw) : 1.27 N·m (13.0kgf·cm)
- Recommended wire type JWS70P/508, JWS120P/508 : AWG12-22 (3.5-0.3mm²)

8. External Fuse Rating

Refer to the following fuse rating when selecting the external fuses that are to be used on input line. Surge current flows when line turns on. Use slow-blow fuse or time-lug fuse. Do not use fast-blow fuse. Fuse rating is specified by in-rush current value at line turn-on. Do not select the fuse according to input current (rms.) values under the actual load condition.

JWS70P: 5A JWS120P: 6.3A

9. Before concluding that the unit is at fault...

Before concluding that the unit is at fault, make the following checks.

- Check if the rated input voltage is connected.
- Check if the wiring of input and output is correct.
- Check if the wire material is not too thin.
- Check if the output voltage control (V.ADJ) is properly adjusted.
- Check if the output current and output wattage dose not exceed specification.
- Audible noise can be heard during dynamic-load operation.
- Audible noise can be heard when input voltage waveform is not sinusoidal wave.

10. Notes

1. Overvoltage Category II

2. Radio Interference Suppression Test is not performed.

11. JWS70P/508, JWS120P/508 UL508 Listed Condition

1. Surrounding Air Temperature JWS70P/508: 40°C JWS120P/508: 50°C

- 2. Wire Requirement
 - Use min. 60°C or 60/75°C wire.
 - Use copper conductor only.
- 3. For use in a Pollution degree 2 environment only.
- 4. Indoor use only.

JWS-P

JWS 240P, 480P

JWS 240P, 480P Series Instruction Manual

● JWS70P, 120P Instruction Manual (→ A209Page

BEFORE USING THE POWER SUPPLY UNIT

Pay attention to all warnings and cautions before using the unit. Incorrect usage could lead to an electrical shock, damage to the unit or a fire hazard.

WARNING and CAUTION

Do not modify nor remove cover.

- Do not touch the internal components, they may have high voltage or high temperature. You may get electrical shock or burned.
- When the unit is operating, keep your hands and face away from it; you may get injured by an accident.
- This power supply is primarily designed and manufactured to be used and enclosed in other equipment. Stick the WARN-ING label for users on the system equipment and describe the notice in the instruction manual.
- Never operate the unit under over current or shorted condi-

tions for long time which could result in damage or insulation failure. There is no possibility for fire or burning.

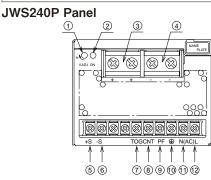
- Confirm connections to input/output terminals are correct as indicated in the instruction manual.
- This power supply has a possibility that hazardous voltage may occur in output terminal depending on failure mode. The outputs of these products must be earthed in the end use equipment to maintain SELV.

If the outputs are not earthed, they must be considered hazardous and must not be made user accessible.

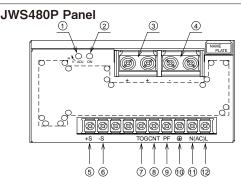
⚠ Note: CE MARKING

CE Marking, when applied to a product covered by this handbook, indicates compliance with the low voltage directive (73/23/EEC) as modified by the CE Marking Directive (93/68/ EEC) which complies with EN60950.

1. Terminal Explanation



- ① V.ADJ : Output voltage adjust trimmer
- (The output voltage rises when a trimmer is turned clockwise.)
- ② ON : Output (Power On) indication LED
- (The indicator turns on when the power supply output is in normal operating condition.)
- (3) + : + Output terminal (M5 screw x 2)
- ④ : Output terminal (M5 screw x 2)
- (5) +S : Remote sensing terminal for + output
- (for remote sensing function, this compensates for line drop between power supply terminals and load terminals.)
- ⑥ -S : Remote sensing terminal for output



(for remote sensing function which compensates for line drop between power supply terminals and load terminals.)

- TOG : Ground for CNT and PF signal
 ONT : ON (OEE control torminal (for pr
- ⑧ CNT : ON/OFF control terminal (for power supply output on and off control with an external signal.)
- ④ PF : Power fail signal output terminal (As the output voltage drops, "Power Fail" terminal will output "High".)
- 10 1 : Safety Earth (Frame ground)
- 1 AC input terminal N : Neutral line
- 1 AC input terminal L : Live Line (Fuse in line)

2. Terminal Connection Method

- Input must be off when making connection.
- Connect (1) terminal to ground terminal of the equipment.
- The output load line and input line shall be separated and twisted to improve noise sensitivity.

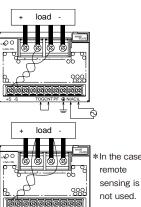
JWS240P Panel Side (Common JWS480P)

Basic connection (Local sensing)

Connect "+S" terminal to "+" terminal and "-S" terminal to "-" terminal with sensing wires. Connect "CNT" terminal to "TOG" terminal with the short piece.

ON/OFF control required

Remove the short piece on "CNT" and "TOG" terminals. "TOG" terminal is ground for "CNT" terminal.



- Remote sensing lines shall be twisted or use shielded wire.
 - Remote ON/OFF control lines shall be twisted or use shielded wire.

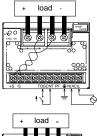
Remote sensing required

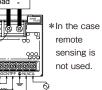
Connect "+S" terminal to "+" terminal of load and "-S" terminal to "-" output terminal of load with wires. *When remote sensing terminals are

opened, output is shut down.

PF signal output required

Open collector method shown below shall be used. "TOG" terminal is ground for "PF" terminal.





3. Functions and Precautions

Input Voltage Range

Input voltage range is single phase $85\,{\sim}\,265\text{VAC}$ (47 ${\sim}\,$ 63Hz). Input voltage which is out of specificamay cause unit damage.

2 Output Voltage Range

V.ADJ trimmer on the front panel side can adjust the output voltage within the range. Output voltage range is within +20%~ -10% of nominal output voltage (48V Output Model: $\pm 10\%$). To turn the trimmer clockwise, the output voltage will be increased. Note over voltage protection (OVP) function may trigger if the output voltage is increased excessively.

Over Voltage Protection (OVP)

The OVP function (inverter shut down method, manual reset type) is provided. When OVP triggers, the output will be shut down. The input shall be removed for a few minutes, and then re-input for recovery of the output. OVP setting shall be fixed and not to be adjusted externally.

4 Over Current Protection (OCP)

Constant current limiting, automatic recovery.

OCP function operates when the output current exceeds 204% of average output current on specification. The output will be automatically recovered when the overload condition is canceled.

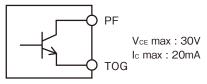
When the unit operate under over peak current for more than 10 seconds, the output voltage will shut down. Remove the input for a few minutes, and then re-input for recovery of the output.

5 Over Temperature Protection (OTP)

Over temperature protection function is provided. When ambient or internal temperature rises abnormally, OTP will shut down the output. After shut down, first remove the input and cool it down before re-input.

6 Low Output Detection Circuit

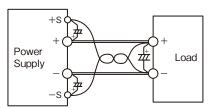
Low output detection circuit is provided. PF signal will turn "High" level to indicate the abnormal status when the output voltage becomes within $65 \sim 80\%$ of rated value caused by either the drop or brown out of the input voltage or OCP, OVP and OTP function operation. The PF signal is insulated by a photo coupler. It uses the open collector method shown in below.



7 Remote Sensing (+S, -S terminal)

This function compensates voltage drop of wiring from output terminals to load terminals. Connect "+S" terminal to "+" terminal of load and "-S" terminal to "-" terminal of load with sensing wires. The total line voltage drop (+ side line and - side line) shall be less than 0.3V. In case that sensing line is too long, it is necessary to put an electrolytic capacitor in following 3 placed;

- 1) Across the load terminal,
- 2) Between "+S" terminal and "+" terminal,
- 3) Between "-S" terminal and "-" terminal.



If remote sensing terminals are opened, the output will rise and OVP may be triggered.

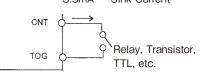
8 Remote ON/OFF Control

Remote ON/OFF control is provided. Using this function, output on/off is allowed to control without input voltage on/off. The output is turned to ON when TOG and CNT terminals are shorted: the output is turned to OFF when these terminals are opened. When the function is not used, connect TOG and CNT terminals with short piece. The standards for this function are as follows.

- TTL compatible. The maximum input voltage to CNT terminal is 12V, and the maximum allowable reverse voltage is -1V. The sink current of CNT terminal is 3.5mA.
- A switch and relay or a transistor can be used as an ON/OFF switch.
- This circuit is isolated from the input and output by a photocoupler. Connect TOG terminal to ground of control signal.

Control mode is shown below.

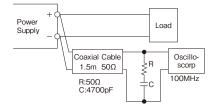
CNT Level for TOG Terminal	Output Condition	Built-in Fan
Short or L (0V \sim 0.8V)	ON	Operate
Open or H (2.4V ~ 12V)	OFF	Stop
3.5mA Sink	Current	



9 Output Ripple & Noise

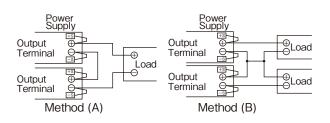
The standard specification for maximum ripple value is measured according to measurement circuit specified by EIAJ-RC9131. When load lines are longer, ripple becomes larger. In this case, electrolytic capacitor, film capacitor, etc. might be necessary to use across the load terminal.

The output ripple cannot be measured accurately if the probe ground lead of oscilloscope is too long.



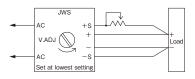
Series Operation

For series operation, either method (A) or (B) is possible.



Remote Programming

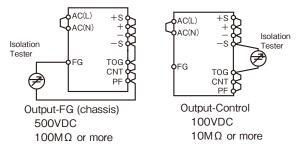
Connecting a remote programming resistor such as a potentiometer between "+S" and "+" terminal, remote programming becomes possible to use. The rate of the change due to the remote programming resistor is $1V/k\Omega$. The output voltage range is $+20\% \sim -10\%$ of the nominal output voltage (48V Output Model: $\pm 10\%$).



4. Isolation/Withstand Voltage

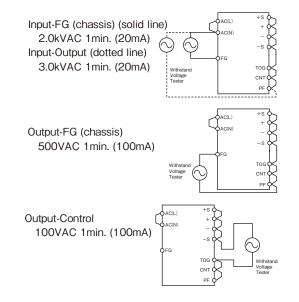
Isolation Test

Isolation resistance between output and FG (chassis) shall be more than 100M Ω at 500VDC and between output and control shall be more than 10M Ω at 100VDC. For safety operation, voltage setting of DC isolation tester must be done before the test. Ensure that it is fully discharged after the test.



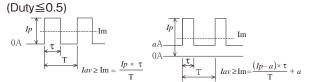
2 Withstand Voltage

This series is designed to withstand 3.0kVAC between input and output, 2.0kVAC between input and FG (chassis), 500VAC between output and FG (chassis), and 100VAC between output and control terminal each for 1 minute. When testing withstand voltage, set current limits of withstand voltage test equipment at 20mA (Output-FG (chassis) and Output-Control: 100mA). The applied voltage must be gradually increased from zero to testing value and then gradually decreased for shut down. When timer is used, the power supply may be damaged by high impulse voltage at timer switch on and off. Connect input and output as follows.



5. Peak Output Current

For JWS-P series, relation between average output current and peak output current must satisfy formulas below. Also operating time at peak output current should be less than 10sec.



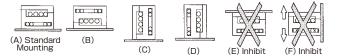
- Ip: Peak output current (A)
- lav: Average output current of Specification (A)
- Im: Average output current (A)
- r: Pulse width of peak output current (sec) (Operating time at peak output)
- T: Period (sec)

JWS-P

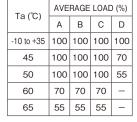
6. Mounting Directions

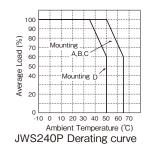
1 Output Derating according to the Mounting Directions

Recommended standard mounting method is (A). Method (B), (C) and (D) are also possible. Refer to the derating below. In the following derating curve, the average output current is considered to be 100%.

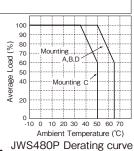


JWS240P Output Derating





JWS480P Output Derating						
To (°C)	AVE	AVERAGE LOAD (%)				
Ta (℃)	А	В	С	D		
-10 to +35	100	100	100	100		
45	100	100	70	100		
50	100	100	55	100		
60	70	70	-	70		
65	55	55	-	55		

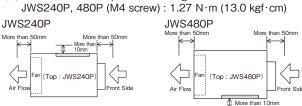


2 Mounting Method

(1) Forced air cooling type power supply. This power supply has ventilating holes on the front, back, and side panels. Keep these three areas freely as much as possible.

(2) The maximum allowable penetration of mounting screws is 6mm.

(3) Recommended torque for mounting screw :



7. Wiring Method

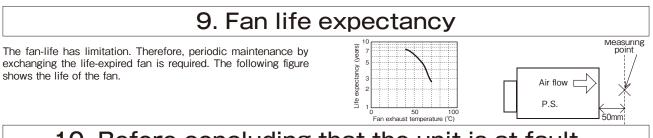
- (1) The output load line and input line shall be separated and twisted to improve noise sensitivity.
- (2)The sensing lines shall be twisted and separated from the output lines.
- (3)Use all lines as thick and short as possible to make lower impedance.
- (4)Noise can be eliminated by attaching a capacitor to the load terminals.
- (5) For safety and EMI considerations, connect 🕀 terminal to
- the mounting set ground terminal.
- (6) Recommended torque for the terminal piece: Output terminal (M5 screw) : 2.50 N·m (25.5 kgf·cm) Input and signal terminal (M4 screw) : 1.27 N·m (13.0 kgf·cm)
- (7) Recommended wire type (JWS240P/508, JWS480P/508) : Output terminal : AWG10-18 (5.5-0.83mm²) Input and signal terminal : AWG12-22 (3.5-0.3mm²)

8. External Fuse Rating

Refer to the following fuse rating when selecting the external fuses that are to be used on input line. Surge current flows when line turns on. Use slow-blow fuse or time-lug type fuse. Do not use fast-blow fuse. Fuse rating is specified by in-rush current value at line turn-on. Do not select the fuse according to input

current (rms.) values under the actual load condition.

JWS240P: 10A JWS480P: 20A



10. Before concluding that the unit is at fault…

Before concluding that the unit is at fault, make the following checks.

- (1) Check if the rated input voltage is connected.
- Check if the wiring of input and output is correct. (2)
- Check if the wire material is not too thin. (3)
- (4)Check if the output voltage control (V.ADJ) is properly adjusted.

1. Overvoltage Category II

- (5) If use function of the Remote ON/OFF control, check if the Remote ON/OFF control connector is not opened.
- Check if the output current and output wattage dose not over specification.
- Audible noise can be heard during Dynamic-Load operation. (7)
- (8) Audible noise can be heard when input voltage waveform is not sinusoidal wave.

· All specifications are subject to change without notice

11. Notes

2. Radio Interference Suppression Test is not performed.

12. JWS240P/508, JWS480P/508 UL508 Listed Condition

1. Surrounding Air Temperature : 40°C 2. Wire Requirement

· Use min. 60°C or 60/75°C wire.

3. For use in a Pollution degree 2 environment only. 4. Indoor use only.