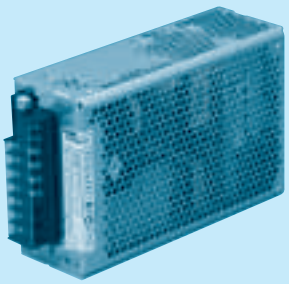
COSEL **Unit type**

ADA600F

Ordering information

ADA 600 F -24 -□

① ② ③ ④ ⑤



①Series name
②Output wattage
③Universal input
④Output voltage
⑤Optional
G :Low leakage current
E :Low leakage current and EMI class A
F :with Fan unit(only -24)
T :Vertical terminal block
J :Connector type
C :with Coating
R :Remote ON/OFF
N1:DIN rail
W:Alarms and Redundant operation

Specification is changed at option,refer to Instruction Manual.

Please refer to derating curve, because the rated load current depends on cooling method that is convention cooling or forced air.

SPECIFICATIONS

	MODEL		ADA600F-24	ADA600F-30	ADA600F-36	ADA600F-48
INPUT	VOLTAGE[V]		AC85 - 264 1φ or DC 120 - 350 (AC70 or DC100 optionally available ＊6)			
	FREQUENCY[Hz]		50/60 (47 - 63) or DC			
	EFFICIENCY[%]	ACIN 100V	84typ (Io=100%)	86typ (Io=100%)	86typ (Io=100%)	86typ (Io=100%)
		ACIN 200V	86typ (Io=100%)	87typ (Io=100%)	87typ (Io=100%)	89typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)			
		ACIN 200V	0.98typ (Io=100%)			
	INRUSH CURRENT[A]	ACIN 100V ＊1	20typ (Io=100%) (More than 3sec.to re-start)			
		ACIN 200V ＊1	40typ (Io=100%) (More than 3sec.to re-start)			
	LEAKAGE CURRENT[mA]		0.75max (60Hz, According to IEC60950 and DEN-AN) (Io=100%)			
OUTPUT	VOLTAGE[V]		24	30	36	48
	CURRENT[A]	ACIN 100V ＊2	14 (Peak 25) convection	11 (Peak 20) convection	9 (Peak 16.5) convection	6.5 (Peak 12.5) convection
		ACIN 100V ＊2	21 (Peak 25) forced air	16.5 (Peak 20) forced air	14 (Peak 16.5) forced air	10.5 (Peak 12.5) forced air
		ACIN 200V ＊2	15 (Peak 31) convection	12 (Peak 24.5) convection	10 (Peak 20.5) convection	7 (Peak 15.5) convection
		ACIN 200V ＊2	25 (Peak 31) forced air	20 (Peak 24.5) forced air	16.5 (Peak 20.5) forced air	12.5 (Peak 15.5) forced air
	LINE REGULATION[mV]		96max	120max	144max	192max
	LOAD REGULATION[mV]		150max	180max	240max	300max
	RIPPLE[mVp-p]	0 to +50℃ ＊3	120max	160max	200max	200max
		-10 - 0℃ ＊3	160max	230max	260max	300max
	RIPPLE NOISE[mVp-p]	0 to +50℃ ＊3	150max	190max	230max	250max
		-10 - 0℃ ＊3	180max	250max	280max	400max
	TEMPERATURE REGULATION[mV]	0 to +50℃	240max	300max	360max	480max
	DRIFT[mV]	＊4	96max	120max	144max	192max
	START-UP TIME[ms]		500max (ACIN 100V, Io=100%)			
	HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)			
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		21.6 - 27.0	27.0 - 33.0	33.0 - 41.0	41.0 - 52.8
	OUTPUT VOLTAGE SETTING[V]		23.5 - 24.5	29.0 - 31.0	35.0 - 37.0	47.0 - 49.0
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 101% of peak current and recovers automatically			
	OVERVOLTAGE PROTECTION[V]		31 - 34.5	40 - 48	51 - 60	64 - 76
	OPERATING INDICATION		LED (Green)			
	ALARM OUTPUT		Detecting low input voltage(PF), detecting low output voltage(LV). (Optional : -W, refer to Instruction Manual 5)			
	REMOTE ON/OFF(RC)		Requirement for external source (Option : -R, refer to Instruction Manual 5)			
ISOLATION	INPUT-OUTPUT · RC	＊5	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT · RC-FG	＊5	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE		-10 to +71℃, 20 - 90%RH (Non condensing) (Refer to DERATING CURVE), 3,000m (10,000feet) max			
	STORAGE TEMP.,HUMID.AND ALTITUDE		-20 to +75℃, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION		10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS		UL60950, C-UL(CSA60950), EN60950, EN50178 Complies with DEN-AN and IEC60950 (At only AC input)			
	CONDUCTED NOISE		Complies with FCC-B, CISPR22-B, EN55022-B, VCCI-B			
	CE MARKING		Low Voltage Directive, EMC Directive			
	HARMONIC ATTENUATOR		Complies with IEC61000-3-2			
OTHERS	CASE SIZE/WEIGHT		65×127×195mm (W×H×D) (without terminal block) /1.5kg max			
	COOLING METHOD		Convection/Forced air			

＊1 The value is primary surge.The current of input surge to a built-in noise filter (0.2ms or less) is excluded.
＊2 Peak loading for 10sec.And Duty 35% max.Refer to Instruction Manual 4.Forced air is shown in Instruction Manual 2.3.
＊3 This is the value that measured on measuring board with capacitor of 22μF within 150mm from output terminal.Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM101).
＊4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃, with the input voltage held constant at the rated input/output.
＊5 Applicable when remote control (optional) is added.
＊6 Derating is required.Consult us for details.
＊ A sound may occur from power supply at pulse loading.

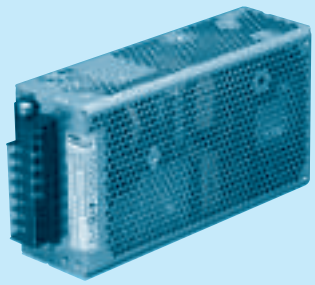
COSEL **Unit type**

ADA750F

Ordering information

ADA 750 F -24 -□

① ② ③ ④ ⑤



①Series name
②Output wattage
③Universal input
④Output voltage
⑤Optional
G :Low leakage current
E :Low leakage current and EMI class A
F :with Fan unit(only -24)
T :Vertical terminal block
J :Connector type
C :with Coating
R :Remote ON/OFF
N1:DIN rail
W:Alarms and Redundant operation

Specification is changed at option,refer to Instruction Manual.

Please refer to derating curve, because the rated load current depends on cooling method that is convention cooling or forced air.

SPECIFICATIONS

	MODEL		ADA750F-24	ADA750F-30	ADA750F-36	ADA750F-48
INPUT	VOLTAGE[V]		AC85 - 264 1φ or DC 120 - 350 (AC70 or DC100 optionally available ＊6)			
	FREQUENCY[Hz]		50/60 (47 - 63) or DC			
	EFFICIENCY[%]	ACIN 100V	86typ (Io=100%)	86typ (Io=100%)	87typ (Io=100%)	87typ (Io=100%)
		ACIN 200V	88typ (Io=100%)	88typ (Io=100%)	89typ (Io=100%)	89typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)			
		ACIN 200V	0.98typ (Io=100%)			
	INRUSH CURRENT[A]	ACIN 100V ＊1	20typ (Io=100%) (More than 3sec.to re-start)			
		ACIN 200V ＊1	40typ (Io=100%) (More than 3sec.to re-start)			
	LEAKAGE CURRENT[mA]		0.75max (60Hz, According to IEC60950 and DEN-AN) (Io=100%)			
OUTPUT	VOLTAGE[V]		24	30	36	48
	CURRENT[A]	ACIN 100V ＊2	17 (Peak 42) convection	13.5 (Peak 33.5) convection	11 (Peak 28) convection	8 (Peak 21) convection
		ACIN 100V ＊2	25 (Peak 42) forced air	20 (Peak 33.5) forced air	16.5 (Peak 28) forced air	12.5 (Peak 21) forced air
		ACIN 200V ＊2	19 (Peak 63) convection	15 (Peak 50) convection	12.5 (Peak 42) convection	9 (Peak 31.5) convection
		ACIN 200V ＊2	31.5 (Peak 63) forced air	24.5 (Peak 50) forced air	20.5 (Peak 42) forced air	15.5 (Peak 31.5) forced air
	LINE REGULATION[mV]		96max	120max	144max	192max
	LOAD REGULATION[mV]		150max	180max	240max	300max
	RIPPLE[mVp-p]	0 to +50℃ ＊3	120max	160max	200max	200max
		-10 - 0℃ ＊3	160max	230max	260max	300max
	RIPPLE NOISE[mVp-p]	0 to +50℃ ＊3	150max	190max	230max	250max
		-10 - 0℃ ＊3	180max	250max	280max	400max
	TEMPERATURE REGULATION[mV]	0 to +50℃	240max	300max	360max	480max
	DRIFT[mV]	＊4	96max	120max	144max	192max
	START-UP TIME[ms]		500max (ACIN 100V, Io=100%)			
	HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)			
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		21.6 - 27.0	27.0 - 33.0	33.0 - 41.0	41.0 - 52.8
	OUTPUT VOLTAGE SETTING[V]		23.5 - 24.5	29.0 - 31.0	35.0 - 37.0	47.0 - 49.0
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 101% of peak current and recovers automatically			
	OVERVOLTAGE PROTECTION[V]		31 - 34.5	40 - 48	51 - 60	64 - 76
	OPERATING INDICATION		LED (Green)			
	ALARM OUTPUT		Detecting low input voltage(PF), detecting low output voltage(LV). (Optional : -W, refer to Instruction Manual 5)			
	REMOTE ON/OFF(RC)		Requirement for external source (Option : -R, refer to Instruction Manual 5)			
ISOLATION	INPUT-OUTPUT · RC	＊5	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT · RC-FG	＊5	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE		-10 to +71℃, 20 - 90%RH (Non condensing) (Refer to DERATING CURVE), 3,000m (10,000feet) max			
	STORAGE TEMP.,HUMID.AND ALTITUDE		-20 to +75℃, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION		10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS		UL60950, C-UL(CSA60950), EN60950, EN50178 Complies with DEN-AN and IEC60950 (At only AC input)			
	CONDUCTED NOISE		Complies with FCC-B, CISPR22-B, EN55022-B, VCCI-B			
	CE MARKING		Low Voltage Directive, EMC Directive			
	HARMONIC ATTENUATOR		Complies with IEC61000-3-2			
OTHERS	CASE SIZE/WEIGHT		70×127×230mm (W×H×D) (without terminal block) /1.9kg max			
	COOLING METHOD		Convection/Forced air			

＊1 The value is primary surge.The current of input surge to a built-in noise filter (0.2ms or less) is excluded.
＊2 Peak loading for 10sec.And Duty 35% max.Refer to Instruction Manual 4.Forced air is shown in Instruction Manual 2.3.
＊3 This is the value that measured on measuring board with capacitor of 22μF within 150mm from output terminal.Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM101).
＊4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃, with the input voltage held constant at the rated input/output.
＊5 Applicable when remote control (optional) is added.
＊6 Derating is required.Consult us for details.
＊ A sound may occur from power supply at pulse loading.

COSEL **Unit type**

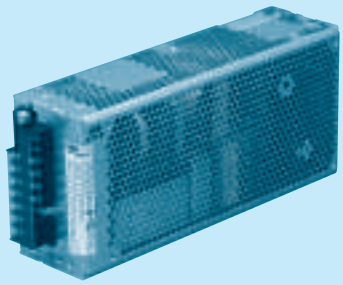
ADA1000F

Ordering information

ADA 1000 F -24 -□

① ② ③ ④ ⑤

ADA



①Series name
②Output wattage
③Universal input
④Output voltage
⑤Optional
G :Low leakage current
E :Low leakage current and EMI class A
F :with Fan unit(only -24)
T :Vertical terminal block
J :Connector type
C :with Coating
R :Remote ON/OFF
N1:DIN rail
W:Alarms and Redundant operation

Specification is changed at option,refer to Instruction Manual.

Please refer to derating curve, because the rated load current depends on cooling method that is convention cooling or forced air.

SPECIFICATIONS

	MODEL		ADA1000F-24	ADA1000F-30	ADA1000F-36	ADA1000F-48
INPUT	VOLTAGE[V]		AC85 - 264 1φ or DC 120 - 350 (AC70 or DC100 optionally available ∗6)			
	FREQUENCY[Hz]		50/60 (47 - 63) or DC			
	EFFICIENCY[%]	ACIN 100V	86typ (Io=100%)	86typ (Io=100%)	87typ (Io=100%)	87typ (Io=100%)
		ACIN 200V	88typ (Io=100%)	88typ (Io=100%)	89typ (Io=100%)	89typ (Io=100%)
	POWER FACTOR	ACIN 100V	0.99typ (Io=100%)			
		ACIN 200V	0.98typ (Io=100%)			
	INRUSH CURRENT[A]	ACIN 100V ∗1	20typ (Io=100%) (More than 3sec.to re-start)			
		ACIN 200V ∗1	40typ (Io=100%) (More than 3sec.to re-start)			
	LEAKAGE CURRENT[mA]		0.75max (60Hz, According to IEC60950 and DEN-AN) (Io=100%)			
OUTPUT	VOLTAGE[V]		24	30	36	48
	CURRENT[A]	ACIN 100V ∗2	21 (Peak 63) convection	16.5 (Peak 50) convection	14 (Peak 42) convection	10.5 (Peak 31.5) convection
		ACIN 100V ∗2	33 (Peak 63) forced air	26 (Peak 50) forced air	22 (Peak 42) forced air	16.5 (Peak 31.5) forced air
		ACIN 200V ∗2	25 (Peak 83) convection	20 (Peak 66) convection	16.5 (Peak 55) convection	11.5 (Peak 41.5) convection
		ACIN 200V ∗2	42 (Peak 83) forced air	33.5 (Peak 66) forced air	28 (Peak 55) forced air	21 (Peak 41.5) forced air
	LINE REGULATION[mV]		96max	120max	144max	192max
	LOAD REGULATION[mV]		150max	180max	240max	300max
	RIPPLE[mVp-p]	0 to +50℃ ∗3	120max	160max	200max	200max
		-10 - 0℃ ∗3	160max	230max	260max	300max
	RIPPLE NOISE[mVp-p]	0 to +50℃ ∗3	150max	190max	230max	250max
		-10 - 0℃ ∗3	180max	250max	280max	400max
	TEMPERATURE REGULATION[mV]	0 to +50℃	240max	300max	360max	480max
	DRIFT[mV]	∗4	96max	120max	144max	192max
	START-UP TIME[ms]		500max (ACIN 100V, Io=100%)			
	HOLD-UP TIME[ms]		20typ (ACIN 100V, Io=100%)			
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		21.6 - 27.0	27.0 - 33.0	33.0 - 41.0	41.0 - 52.8
	OUTPUT VOLTAGE SETTING[V]		23.5 - 24.5	29.0 - 31.0	35.0 - 37.0	47 - 49
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 101% of peak current and recovers automatically			
	OVERVOLTAGE PROTECTION[V]		31 - 34.5	40 - 48	51 - 60	64 - 76
	OPERATING INDICATION		LED (Green)			
	ALARM OUTPUT		Detecting low input voltage(PF), detecting low output voltage(LV). (Optional : -W, refer to Instruction Manual 5)			
	REMOTE ON/OFF(RC)		Requirement for external source (Option : -R, refer to Instruction Manual 5)			
ISOLATION	INPUT-OUTPUT · RC	∗5	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	INPUT-FG		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)			
	OUTPUT · RC-FG	∗5	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)			
ENVIRONMENT	OPERATING TEMP.,HUMID.AND ALTITUDE		-10 to +71℃, 20 - 90%RH (Non condensing) (Refer to DERATING CURVE), 3,000m (10,000feet) max			
	STORAGE TEMP.,HUMID.AND ALTITUDE		-20 to +75℃, 20 - 90%RH (Non condensing), 9,000m (30,000feet) max			
	VIBRATION		10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60minutes each along X, Y and Z axis			
	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis			
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS		UL60950, C-UL(CSA60950), EN60950, EN50178 Complies with DEN-AN and IEC60950 (At only AC input)			
	CONDUCTED NOISE		Complies with FCC-B, CISPR22-B, EN55022-B, VCCI-B			
	CE MARKING		Low Voltage Directive, EMC Directive			
	HARMONIC ATTENUATOR		Complies with IEC61000-3-2			
OTHERS	CASE SIZE/WEIGHT		75×127×280mm (W×H×D) (without terminal block) /2.5kg max			
	COOLING METHOD		Convection/Forced air			

∗1 The value is primary surge.The current of input surge to a built-in noise filter (0.2ms or less) is excluded.
∗2 Peak loading for 10sec.And Duty 35% max.Refer to Instruction Manual 4.Forced air is shown in Instruction Manual 2.3.
∗3 This is the value that measured on measuring board with capacitor of 22μF within 150mm from output terminal.Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM101).
∗4 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25℃, with the input voltage held constant at the rated input/output.
∗5 Applicable when remote control (optional) is added.
∗6 Derating is required.Consult us for details.
∗ A sound may occur from power supply at pulse loading.

Basic Characteristics Data

Model	Circuit method	Switching frequency [kHz]	Input current [A]	Rated input fuse	Inrush current protection	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
ADA600F	Active filter	85	5.9 (Peak 7.0)	250V 12A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	130								
ADA750F	Active filter	85	6.9 (Peak11.8)	250V 20A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	130								
ADA1000F	Active filter	85	9.5 (Peak18.2)	250V 25A	SCR	FR-4		Yes	Yes	Yes
	Forward converter	130								

* Refer to Instruction Manual.
* The value of input current is at ACIN 100V and rated load (peak).

ADA

1 Function

1.1 Input voltage range

■The range is from AC85V to AC264V or DC120V to DC350V.
Only AC input is available to comply with agency approval.
■AC input voltage must have a range from AC85V to AC264V for normal operation. If the wrong input is applied, the unit will not operate properly and/or may be damaged.

1.2 Inrush current limiting

■Inrush current limiting is built-in.
■If a switch on the input side is installed, it has to be the one handling the input inrush current.
■The thyristor technique is used for protection from inrush current.
When power is turned ON/OFF repeatedly within a short period of time, it is necessary to have enough time between power ON and OFF to operate resistance circuit for inrush current.

1.3 Overcurrent protection

■Overcurrent protection is built-in and comes into effect at over 101% of the peak current in. Overcurrent protection prevents the unit from short circuit and overcurrent condition.
The unit automatically recovers when the fault condition is cleared.

●Intermittent current characteristics

■When the output voltage drops more than 50% of the rated output voltage value at overcurrent, the average output current is reduced by intermittent operation of power supply.

1.4 Peakcurrent protection

■Peakcurrent protection is built-in (The protection circuit operates when load current exceeds the rating current and the use deviates from the condition in Instruction Manual 4).
If this function comes into effect, the output is shut down (delayed shut down).
The minimum interval of AC recycling for recovery is 3 to 4 minutes (✻).
✻The recovery time varies depending on input voltage and load condition.

1.5 Thermal protection

■Thermal protection circuit is built-in and shut down under following condition.
①When the current and the temperature which exceed from the derating curve.
②The case FAN stops or air flow is interrupted and the amount of the wind decreases.
After cut off input voltage and cooling down inside of power supply, turns on the input of the power supply again.

1.6 Overvoltage protection

■The overvoltage protection circuit is built-in. The AC input should be shut down if overvoltage protection is in operation. The minimum interval of AC recycling for recovery is 3 to 4 minutes (✻).
✻The recovery time varies depending on input voltage.

Remarks : Please avoid applying the over-rated voltage to the output terminal. Power supply may operate incorrectly or fail. Incase of operating a motor etc. , please install an external diode on the output terminal to protect the unit.

1.7 Output voltage adjustment range

■Adjustment of output voltage is possible by using potentiometer.
■Output voltage is increased by turning potentiometer clockwise and is decreased by turning potentiometer counterclockwise.

1.8 Isolation

■For a receiving inspection, such as Hi-Pot test gradually increase (decrease) the voltage for the start (shut down).
Avoid using Hi-Pot tester with the timer because it may generate voltage a few times higher than the applied voltage, at ON/OFF of a timer.
If the unit is tested on the isolation between input & output and output & FG, remote ON/OFF (option) must be shorted to outputs.

2 Assembling and Installation Method

2.1 Installation method

■When two or more power supplies are used side by side, position them with proper intervals to allow enough air ventilation. Ambient temperature around each power supply should not exceed the temperature range shown in derating curve.
■Fix firmly, considering weight, though it can be used by the installation method shown in Fig.2.2.

2.2 Mounting screw

■The screw should be inserted up to 6mm max from outside of the power supply to keep a distance between inside parts and an isolation (Fig.2.1).

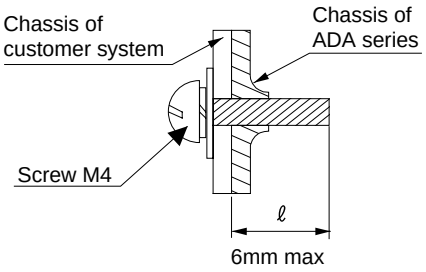


Fig.2.1 Mounting screw

2.3 Derating

■Derating by ambient temperature

Load factor 100% in each derating curve means rating current in Specifications. Please note load factor 100% depends on input voltage and cooling method.

In the hatched area the specification of Ripple, Ripple Noise is different from other area.

■Convection cooling

①Install the unit to apply enough convection as shown in Fig.2.2.

②Do not block the ventilation hole.

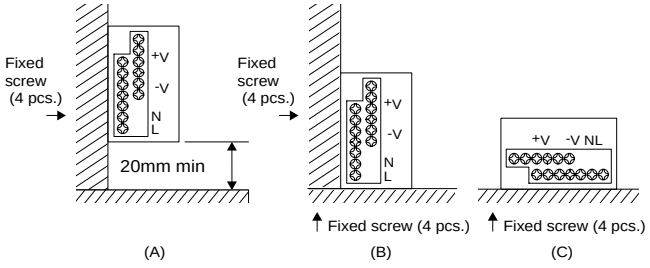
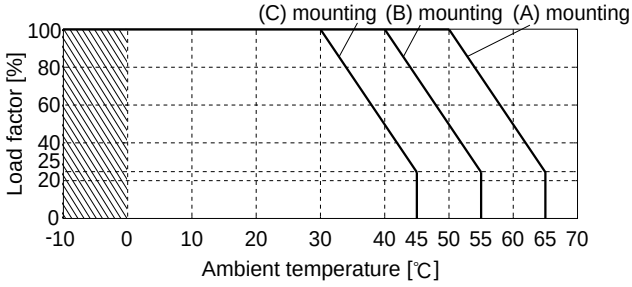


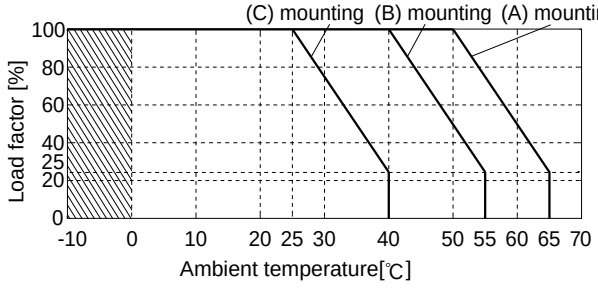
Fig.2.2 Installation method

● ADA600F (convection cooling)



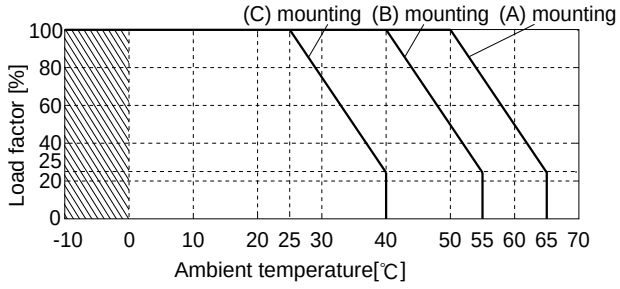
✻In case of ADA600F-24, load factor 100% means output 24V, 14A at ACIN100V, 24V, 15A at ACIN200V.

● ADA750F (convection cooling)



✻In case of ADA750F-24, load factor 100% means output 24V, 17A at ACIN100V, 24V, 19A at ACIN200V.

● ADA1000F (convection cooling)



✻In case of ADA1000F-24, load factor 100% means output 24V, 21A at ACIN100V, 24V, 25A at ACIN200V.

■Forced air cooling

①Please give the entire power supply in ventilation so that the temperature of point A and B in Fig.2.3 is made below a specified temperature. Point A and B are displayed in chassis.

・Point A 60℃ or less and point B 65℃ or less at Ta = 50℃

・Point A 80℃ or less and point B 80℃ or less at Ta = 71℃

Remarks : Please avoid cooling only bottom chassis.

②Ventilation is done evenly and do not block the ventilation hole.

③The confirmation of point A and B in unnecessary when optional fun unit is used. Refer to 5.Option (only output 24V).

✻The derating curve at forced air is common in ADA600F to ADA1000F.

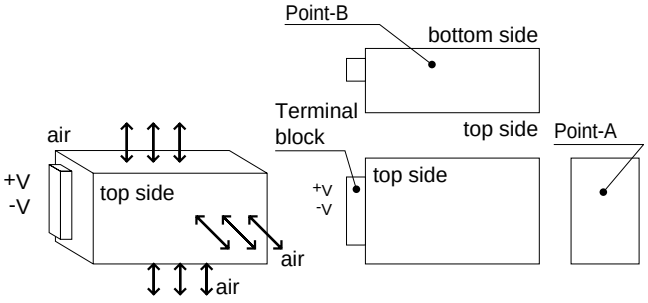
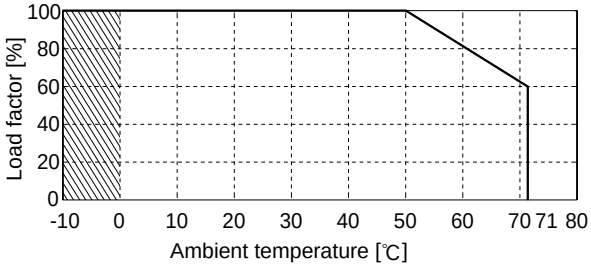


Fig.2.3 Forced air cooling

● ADA600F - ADA1000F (forced air)



✻In case of ADA600F-24, load factor 100% means output 24V, 21A at ACIN100V, 24V, 25A at ACIN200V.

✻In case of ADA750F-24, load factor 100% means output 24V, 25A at ACIN100V, 24V, 31.5A at ACIN200V.

✻In case of ADA1000F-24, load factor 100% means output 24V, 33A at ACIN100V, 24V, 42A at ACIN200V.

2.4 Expectancy life and warranty

■Expectancy life

The expectancy life is as follows. The mean of load factor 100% depends on installation condition, refer to SPECIFICATION.

Installation condition	Average ambient temperature (year)	Load factor	
		50%	100%
Convection * (Installation A)	Ta = 30℃	More than 10 years	More than 10 years
	Ta = 40℃	More than 10 years	6 years
	Ta = 50℃	5 years	3 years
Forced air *	Ta = 30℃	More than 10 years	More than 10 years
	Ta = 40℃	More than 10 years	6 years
	Ta = 50℃	5 years	3 years

＊Refer to 2.3 Derating

■Warranty

The warranty is 5 years when average ambient temperature of year is Ta = 40℃ or less and load factor is average 50% or less. However, the warranty is 3 years when average ambient temperature of year is Ta = 50℃ or less and load factor is series 100%.

2.5 Current monitor

■It is possible to monitor load current by measuring CB voltage that is between CB terminal and -V terminal. The relation between CB voltage and load current is shown in Fig.2.4 to 2.6.

Remarks : Fig.2.4 to 2.6 are nominally, not guarantee.

■Instrument for measuring CB voltage should be an enough high impedance. Instrument with low impedance makes relation between CB voltage and load current change. Please note internal parts might be damaged when CB terminal and -V terminal are short circuit.

■Please use twist pair cable or shield cable between CB terminal and -V terminal, or the operation may be mulfunction.

■Please use oscilloscope for CB voltage at pulse loading.

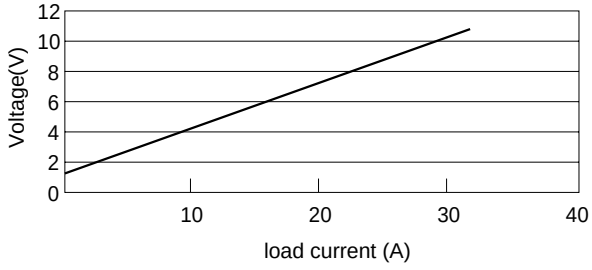


Fig.2.4 Load current conversion graph. (ADA600F-24)

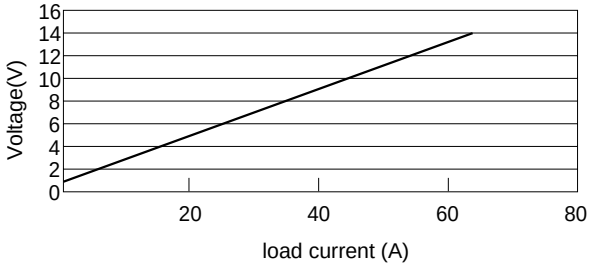


Fig.2.5 Load current conversion graph. (ADA750F-24)

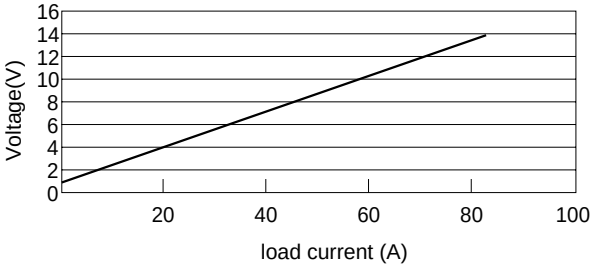


Fig.2.6 Load current conversion graph. (ADA1000F-24)

3 Series Operation and Parallel Operation

3.1 Series operation

■Series operation is available by connecting the outputs of two or more power supplies with the same output voltage, as shown below. Output current in series connection should be lower than the lowest rated current in each unit.

■Parallel operation is show in Fig.3.1

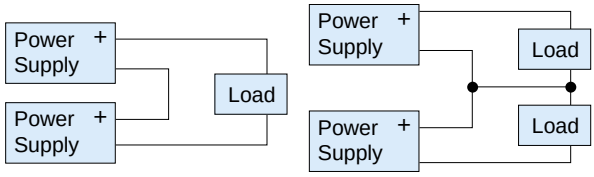


Fig.3.1 Examples of series operation

3.2 Parallel operation/master-slave operation.

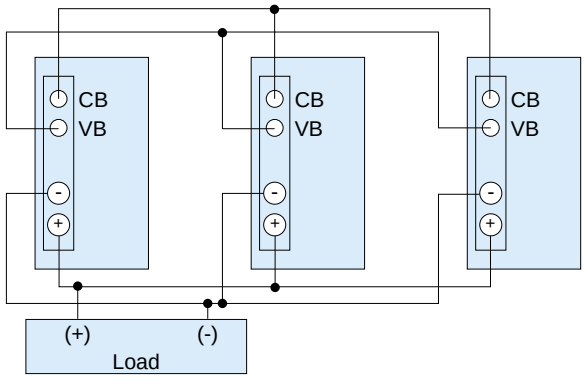
■Parallel operation is available by connecting below.

■As variance of output current drew from each power supply is maximum 10%, the total output current must not exceed the value determined by the following equation.

$$\left[\begin{array}{c}\text{Output current in} \\ \text{parallel operation}\end{array}\right] = \left[\begin{array}{c}\text{the rated} \\ \text{current per unit}\end{array}\right] \times (\text{number of unit}) \times 0.9$$

When the number of units in parallel operation increases, input current increases at the same time. Adequate wiring design for input circuitry is required, such as circuit pattern, wiring and current capacity for equipment.

In parallel operation, the maximum operative number of units is 5.



■Output voltage in parallel operation is adjustable by using the potentiometer of the "master" unit. Select one power supply to be the master, and turn the potentiometer of the other, "slave" power supplies, clockwise to the end. Then use the potentiometer of the mater to adjust output voltage.

■In parallel operation, output voltage increases like stairs due to a delay of the rise time of output voltage at turn on.

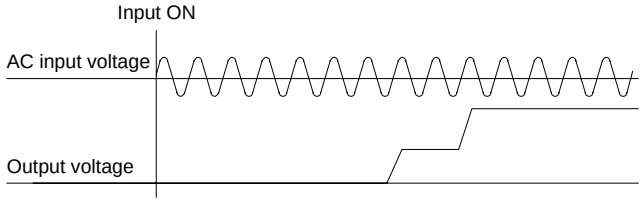


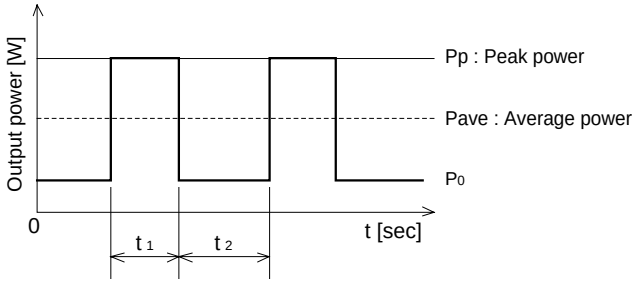
Fig.3.2 Start-up wave form in series and/or parallel operation.

4 Peak Loading

■Peak load is possible to draw as below.

■Please avoid use excluding the following conditions to damage an internal parts.

■Due to the nature of a pulse load, a power supply may make a sound (noise). If the unit is used in an quiet place, consult factory for the load condition in advance.



$t_1 \leqq 10$ [second], $Pave = \frac{Ppt_1 + Pot_2}{t_1 + t_2} \leqq$ rated power

$Duty = \frac{t_1}{t_1 + t_2} \leqq 0.35$ (Refer to below chart)

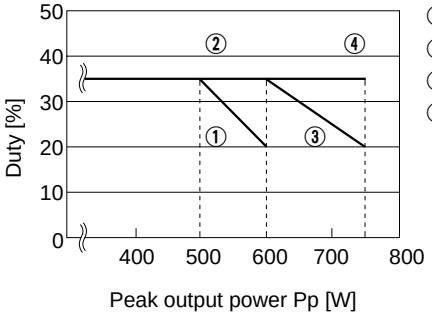


Fig.4.1 Relation between Peak power and Duty. (ADA600F)

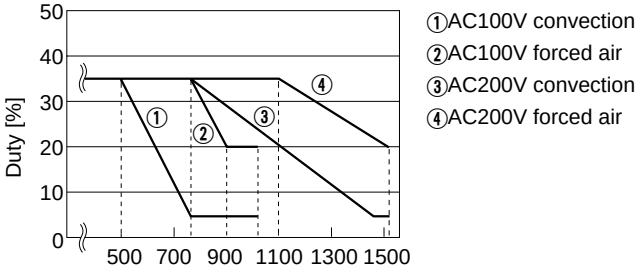


Fig.4.2 Relation between Peak power and Duty. (ADA750F)

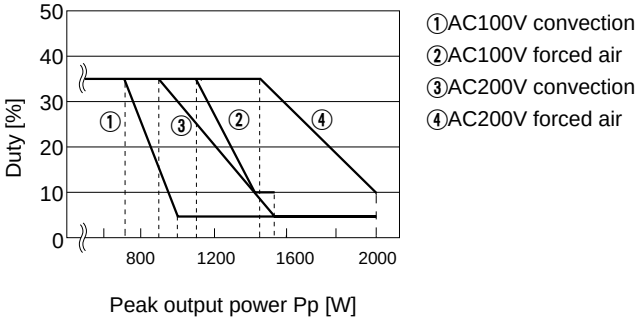


Fig.4.3 Relation between Peak power and Duty. (ADA1000F)

5 Option

5.1 Option outline

■Consult us detailed option and delivery before hand.

■It is possible a combination of the option, and consult us that it is not possible to do according to the option for the combination occasionally.

●-E, -G

・Low leakage current type.

・The difference from standard is shown Table 5.1.

ADA

Table.5.1 Low leakage type

	-E	-G
Leakage current (AC230V)	0.5mA max	0.15mA max
Conducted Noise	Class A	Not available
Ripple Noise	1.5 times standard	2.0 times standard

●-F (Only 24V is prepared. It is not possible combine with option -J)

- Option -F means fan unit is attached to standard model.
- The power source of fan unit is supplied by output power, therefore ripple of fan unit might be occurred in output.
- Consult us external view in detail.
- Regular maintenance is required for fan unit.
  Consult us life expentancy of fan.

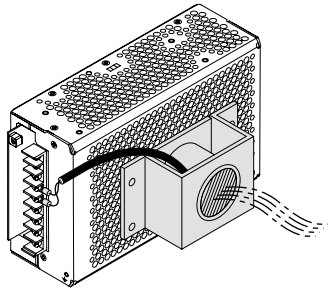


Fig.5.1 Image of option -F

●-T

- -T means terminal block is changed from horizontal to vertical position.
- Notice that the number of terminal pins is different in the standard and the option -T.
- Consult us external view in details.

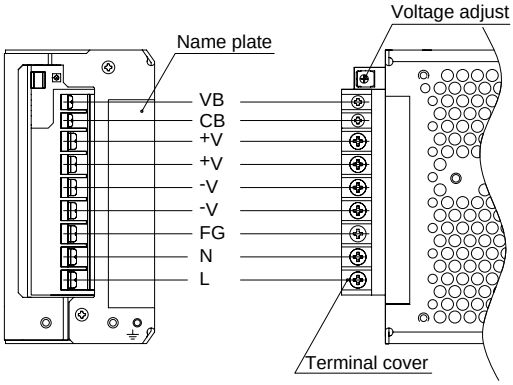
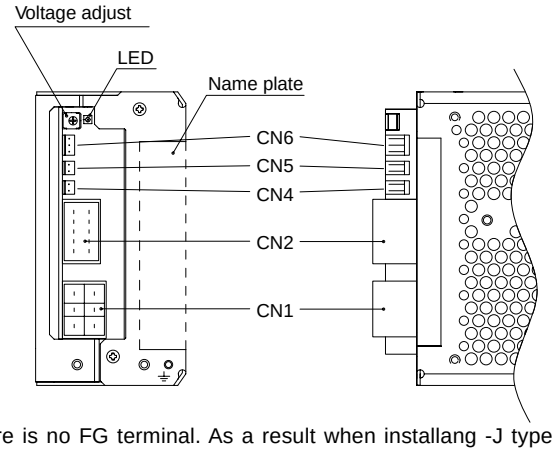


Fig.5.2 Part around terminal block (-T)

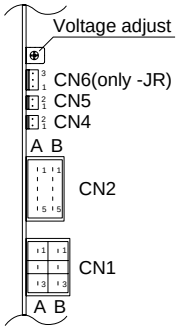
●-J (It is not possible combine with option -W and -F)

- -J means terminal block is changed to connector.
- Special harness is prepared. Refer-to option parts.
- Consult us external view in details.



There is no FG terminal. As a result when installang -J type with your unit, the FG-hole (⏚ marked on the cover) must be connected to safety ground of the unit.

Fig.5.3 Part around connector (-J)



CN1

	Pin No.	Input
A	1	N
	2	NC
	3	L
B	1	N
	2	NC
	3	L

Mating connector(terminal)
Mfr : AMP
1-178129-6
(1-353717-5 equivalent goods)

CN2

	Pin No.	Output
A	1	+V
	2	+V
	3	-V
	4	-V
	5	-V
B	1	+V
	2	+V
	3	+V
	4	-V
	5	-V

Mating connector(terminal)
Mfr : AMP
178289-5
(1-353717-5 equivalent goods)
✻Keep drawing current per pin below 8.5A

CN4,5

Pin No.	Signal
1	CB
2	VB

Mating connector(terminal)
Mfr : AMP
171822-2
(170205-2 equivalent goods)

CN6(only -JR)

Pin No.	Remote ON/OFF
1	RC-
2	NC
3	RC+

Mating connector(terminal)
Mfr : AMP
171822-3
(170205-2 equivalent goods)

●-C

- -C means internal PCB is coated.
  (Humidity improvement goods)

●-R

■Option "-R" is available for remote ON/OFF.

Between RC (+) and RC (-)	Output
SW ON (4.5 - 12.5V)	ON
SW OFF (0 - 0.5V)	OFF

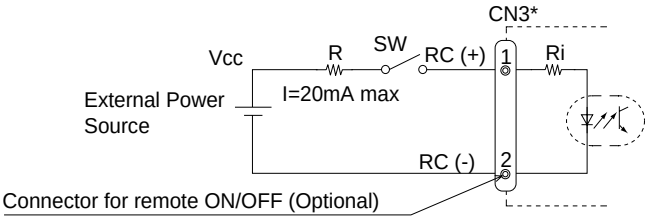


Fig.5.4 Example of using remote ON/OFF

✻When option -R is added to option -J, connector changes, refer to Fig.5.3.

■When external power source is in the range of 4.5 - 12.5V, current limit resistance R is not required. However, when external power source exceeds 12.5V, current limit resistance R must be connected.

To calculate the current limit resistance use following equation :

$$R\ [\Omega] = \frac{Vcc - (1.1 + Ri \times 0.005)}{0.005}$$

Where ;
Vcc = External Power Source
Ri = The internal resistance (780Ω)

■A wrong connection may damage the internal components of the unit.

■Remote ON/OFF circuit (RC (+), RC (-)) is isolated from input, output and FG.

●-N1

- -N1 means DIN rail attachment is attached to standard model.
- Consult us external view in details.
- Terminal block is vertical type (-T).

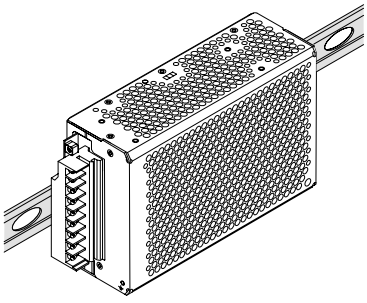


Fig.5.5 Image of installation option -N1.

●-W (It is not possible to combine with option -J)

- -W is available for detecting low input alarm (PF), detecting low output voltage (LV) and operating N+1 redundancy.
- Alarm specification is shown Table 5.2.
- Special harness is prepared, refer to option parts.
- Consult us external view in details.
- Each alarm (PF,LV) is isolated from input, output and FG.

Table 5.2 Explanation of alarms

	Alarm	Output of alarm
PF	When line voltage is abnormal (low input voltage out of range), the alarm outputs from CN3.	Open collector method Good : Low (0 - 0.8V, 1mA max) Fail : 50V max
LV	When the output voltage becomes low or stops, the alarm outputs from CN3. Notice : ①When the output is over current (intermittent current), the alarm is unsettled status. ②When parallel operating without connecting diode, LV alarm is not operating.	Open collector method Good : Low (0 - 0.8V, 1mA max) Fail : 50V max

Please consult us details.

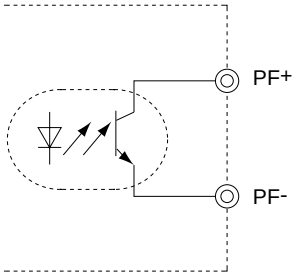


Fig.5.6 Internal circuit of PF

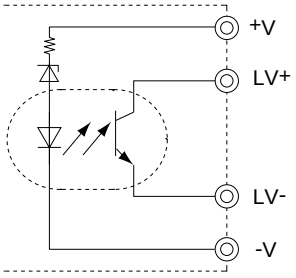


Fig.5.7 Internal circuit of LV

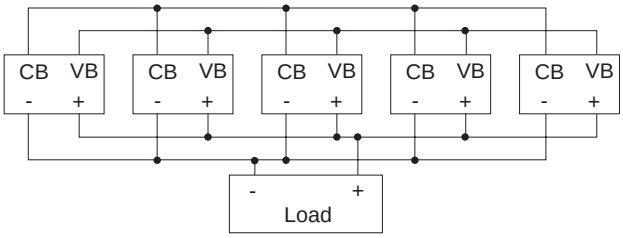


Fig.5.8 N+1 redundant operation

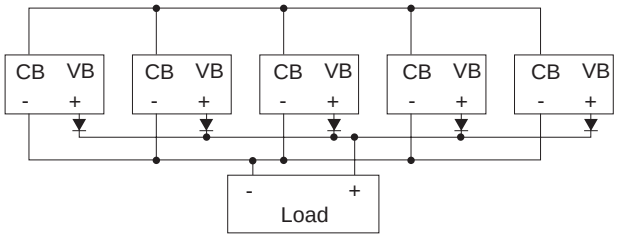


Fig.5.9 N+1 redundant operation which uses diode

■In N+1 redundant operation, even if one power supply breaks down, the system does not stop, because the output is backed up in normal power supplies of the remainder.
However, please consider the following condition.

①5% or less of the output voltage decrease when one power supply stops.

②Even if one power supply stops, normal power supplies of the remainder can output power that meets the following formula.

$$\left[\begin{array}{c}\text{Output current in}\\ \text{parallel operation}\end{array}\right] \leqq \left[\begin{array}{c}\text{the rated}\\ \text{current per unit}\end{array}\right] \times (\text{number of unit}) \times 0.9$$

In parallel operation, the maximum operative number of units is 5.

③Please detach or exchange the broke down power supply after intercepting the input voltage (impossible hot swap).

④The broke down power supply is detached or exchanged, and after output voltage of new one is adjusted alone, the power supply should be connected load (your system).

✻Parallel operation cannot be done with standard model.

・The following electric specifications are different from standard model.

Output Voltage(V)		24	30	36	48
ADA600F ADA750F ADA1000F	Load Regulation (mV)	240 max	300 max	360 max	480 max

⑤Please refer to Fig.5.9 when making the circuit where the diode is used and reliability is high.

・Please connect the diode with +V.

・Please do not connect VB of the power supply mutually.
In this case, master-slave operation cannot be done.

・Please adjust to become 100mV or less the difference of setting VB voltage of each power supply by the potentiometer for the output voltage setting to suppress the change of the output voltage to about 5% or less when one stops.