Nipron GAZE into the future

2022 April

DIN-Rail Power Supply
UDP Series

UDP-120 series

UDP-180 series

UDP-240 series

Nipron Co.,Ltd.

Thin, High-efficiency design

DIN-rail compatible Unit type power supply

UDP SERIES

A countermeasure against momentary power failure / blackout is possible

UDP-120 series

Continuous: **120W** Output voltage: **24V**

Peak: (100/200V AC) **200/300W** Max. efficiency: **92% typ**

Size (W×H×D): **35×124×117.5 mm**

UDP-180 series

Continuous: **180W** Output voltage: **24V**

Peak: (100/200V AC) **200/300W** Max. efficiency: **93.5% typ**

Size (W×H×D): **35×124×117.5 mm**

UDP-240 series

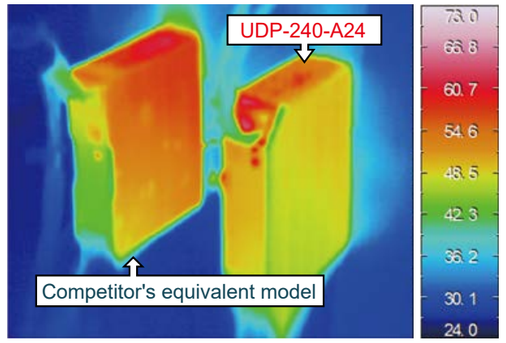
Continuous: **240W** Output voltage: **24V**

Peak: **400W** Max. efficiency: **94% typ**

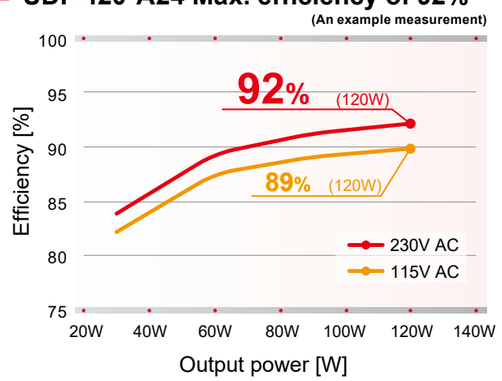
Size (W×H×D): **41×124×117.5 mm**

High-efficiency design

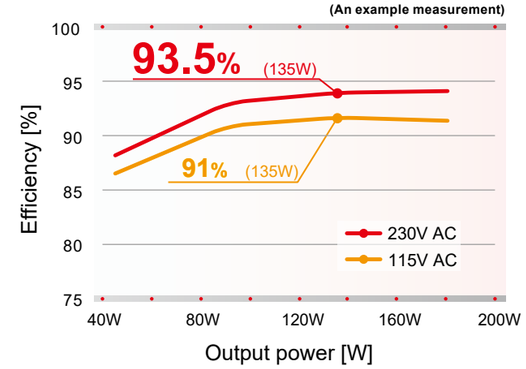
Adopted “soft switching” design. Enabled compact slim size and high efficiency by controlling created heat with switching loss, which is better than “hard switching” design.



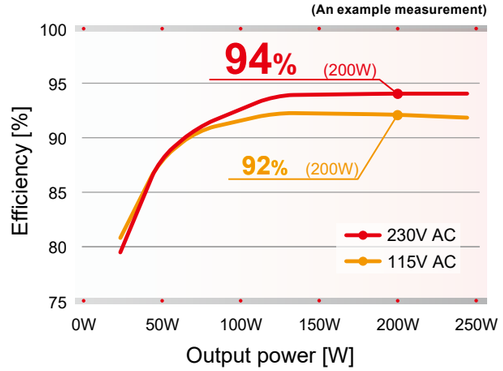
UDP-120-A24 Max. efficiency of 92%



UDP-180-A24 Max. efficiency of 93.5%



UDP-240-A24 Max. efficiency of 94%



Output specifications

Model	UDP-120-A24	UDP-180-A24	UDP-240-A24
Output voltage	+24V	+24V	+24V
Continuous power	120W	180W	240W
Peak power (10s) 100V AC	201.6W	201.6W	400.8W
Peak power (10s) 200V AC	300W	300W	400.8W
Input voltage	85-264V AC (with PFC, worldwide range)		
Safety standards *	UDP-240:	UL (cUL) 62368-1, UL508 certified, CE marking SEMI F47, PSE (ordinance clause 2) compliant	
	UDP-120/180:	UL (cUL) 62368-1, UL508, SEMI F47, PSE (ordinance clause 2) compliant	

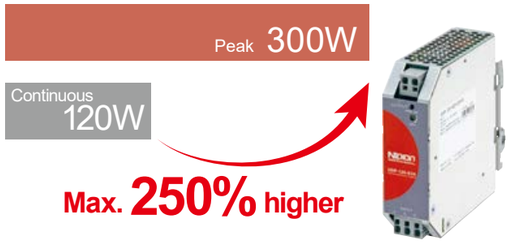
* The model with a service life indicator and the model with a backup function have not acquired the safety standards yet.

High peak power

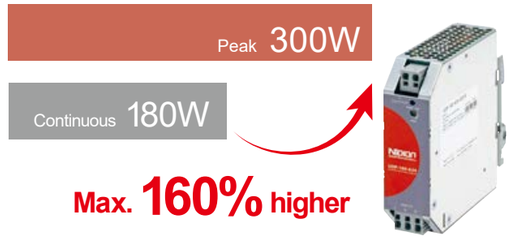
Supports up to 250% peak load

The product supports 10 second output of peak power, which makes it optimum for devices requiring an inrush current, such as motors.

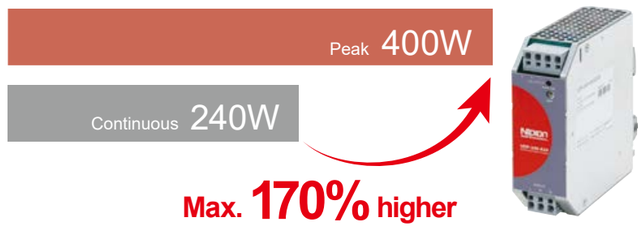
■ UDP-120-A24



■ UDP-180-A24



■ UDP-240-A24



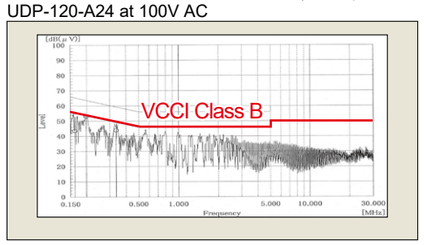
Low noise & Low leakage current

The power supply unit clears VCCI Class B for conducted emissions. No need for an external noise filter, helping to save associated work and costs. In addition, it achieves low leakage current both at 100V AC and 200V AC.

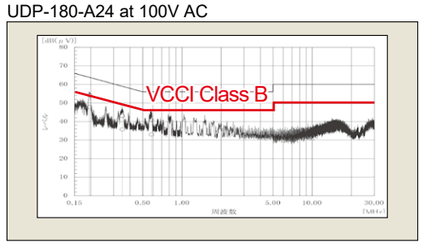
■ Conducted emission characteristics

(an example measurement)

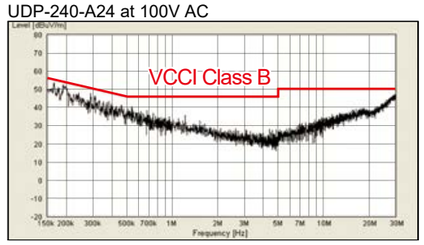
UDP-120-A24 at 100V AC



UDP-180-A24 at 100V AC



UDP-240-A24 at 100V AC



■ Leakage current characteristics

(an example measurement)

UDP-120-A24

	Rated load	Min. load
100V AC	0.11mA	0.12mA
200V AC	0.23mA	0.23mA

UDP-180-A24

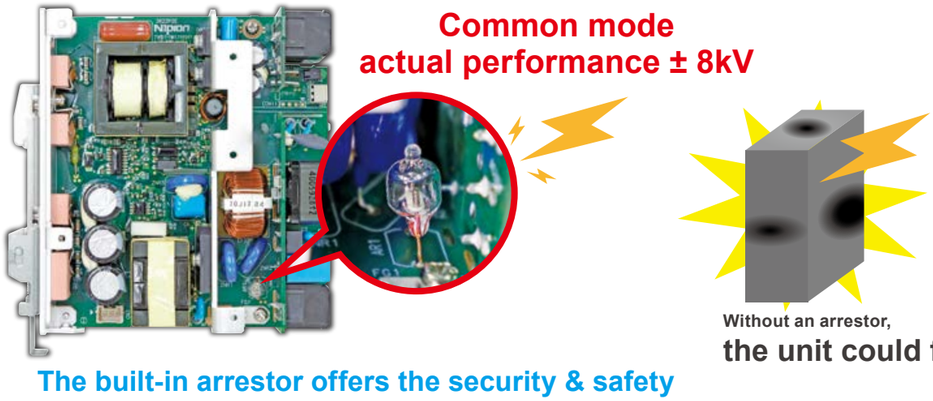
	Rated load	Min. load
100V AC	0.11mA	0.12mA
200V AC	0.23mA	0.23mA

UDP-240-A24

	Rated load	Min. load
100V AC	0.18mA	0.19mA
200V AC	0.39mA	0.39mA

The built-in arrestor enhances the resistance against lightning surges

By incorporating an arrestor as a surge protector, the resistance to external surges due to lightning or other causes has been enhanced.



The built-in arrestor offers the security & safety

Selectable input/output connector type

The PSU comes with European terminal type or screw terminal type as I/O terminals.

■ European terminal type

Output

Input

■ Screw terminal type

Output

Input

Push-in terminals to reduce the burden of wiring and man-hour

The series adopts the push-in connection. Torque control is not required for these spring type terminals and, unlike screw type connections, there is no concern of wires becoming loose. With these terminals, it is possible to maintain the reliability while improving the workability.

Others

- **Momentary power failures can be addressed by connecting a capacitor unit.**
- **Wide operating temperature range from -20°C to 70°C**
  (derating required)
  Flexible mechanical design is possible even when it is installed inside a high-temperature control panel.
- **Able to start-up at -40°C environment**
- **Coated PCB as standard**
- **Equipped with a variable resister to adjust output voltage.**
- **Model with a service life indicator is available.**
  Warnings of the deterioration of the electrolytic capacitor are provided by H/L signals and LEDs.
- **SEMI F47 compliant design**
- **EN62477-1 OVC**Ⅲ **compliant design**

Function list

Model	European terminal type	Screw terminal type	Capacitor unit *	Battery unit *	service life indicator
UDP-***-A24-E00	○	–	–	○	–
UDP-***-A24-T00	–	○	–	○	–
UDP-***-A24-E0X	○	–	–	○	○
UDP-***-A24-T0X	–	○	–	○	○
UDP-***-A24-EB0	○	–	○	○	–
UDP-***-A24-TB0	–	○	○	○	–
UDP-***-A24-EBX	○	–	○	○	○
UDP-***-A24-TBX	–	○	○	○	○

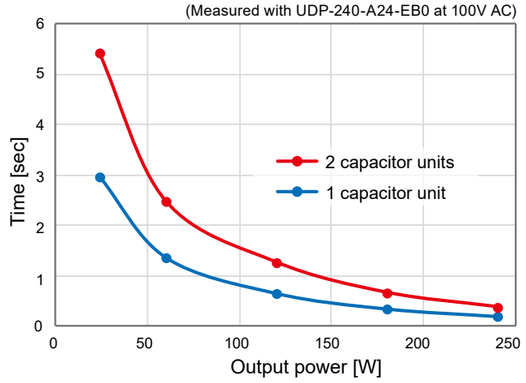
* It will be added to the lineup. For details, please contact us.

Selectable Output Holding Time Extension　Units Based on Your Preferences

DS01A-EC400/172F　Capacitor unit

Output holding time characteristics

Please note that the value shown is an initial reference not guaranteed.
(Measured with UDP-240-A24-EB0 at 100V AC)



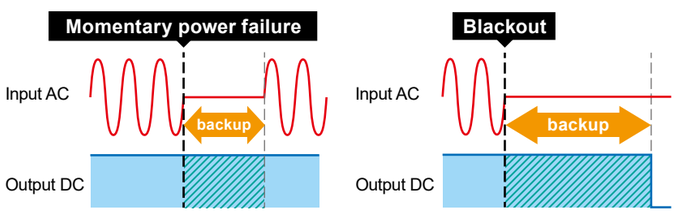
Features

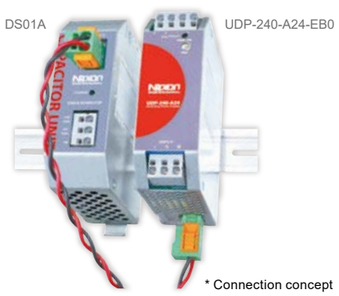
- This product can extend the output holding time of the UDP series and take measures against abnormal input such as instantaneous power failure. (UDP-***-A24-*B*)
- Electrolytic capacitors do not require frequent replacement in contrast to batteries. (expected life: approx. 15 years)
- Blackout detection signal, AC_FAIL, comes standard
- Parallel connection of units extends the holding time.

* Inside

Operation concept

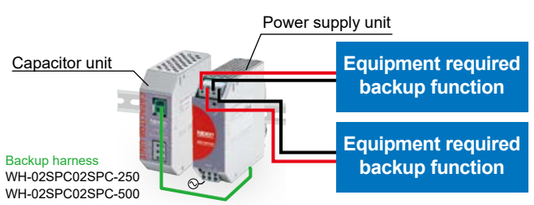
Realizes backup for momentary power failure by extending the output holding time.
This contributes to improved reliability of control panels.



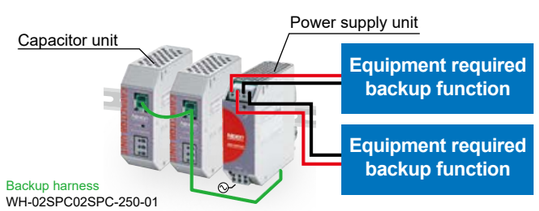


* Connection concept

Connection concept



Connection concept (2 units in parallel)

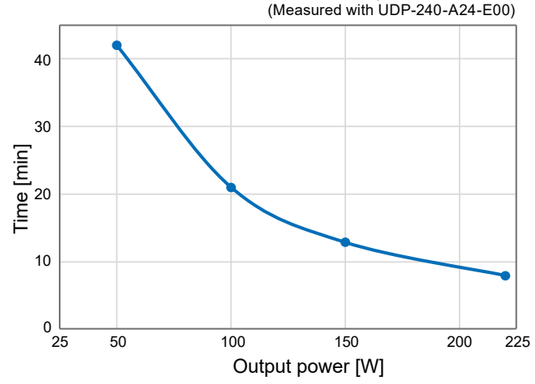


* The power supply to which the capacitor unit can be connected is UDP-***-A24-*B*

DS02A-L24/2.5L　Lithium-ion battery unit

Backup discharge time characteristics

Please note that the value shown is an initial reference not guaranteed.
(Measured with UDP-240-A24-E00)



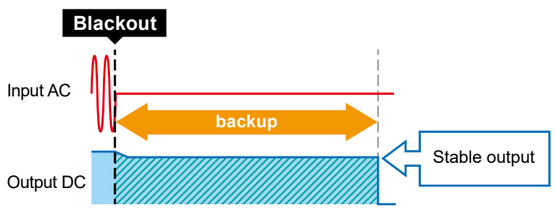
Features

- Backup with no interruption is possible at blackout by connecting this product to UDP series.
- Lithium-ion battery with approximately twice as high energy density as a conventional nickel-metal hydride battery.
- It is possible to detect and notify various battery abnormalities.

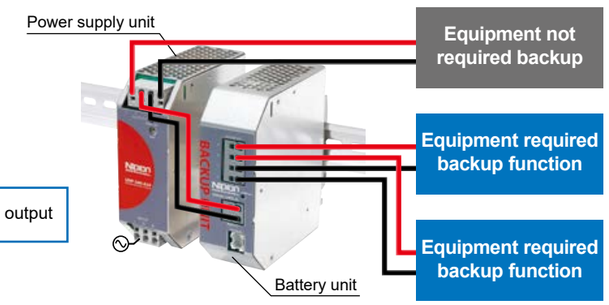
* Inside

Operation concept

Backup with no interruption at blackout is possible.
It can save space rather than using a UPS.



Connection concept



Configurable backup time

The backup time after AC input power failure can be set by DIP switch setting. (Setting time tolerance: ±10%)

Pattern	Switch 1	Switch 2	Discharge time
①	ON	ON	1 min
②	ON	OFF	3 min
③	OFF	ON	5 min
④	OFF	OFF	Until discharge cut-off voltage

*Factory setting is pattern ④

Battery condition indicator

The LED shows the battery condition.

Condition	LED (Green)	LED (Red)	Notes
Fully charged	ON	OFF	–
Charging	Blinking every 2s	OFF	–
Discharging	Flashing	OFF	–
Detecting abnormality	OFF	ON	Abnormality in the battery unit
Abnormal input	OFF	Flashing	The input voltage is out of the specification.
Abnormal temperature	OFF	Blinking every 2s	Standby for charging

Single Output Power Supply UDP-120 series

Input/Output terminal type	Model	Output voltage	Output current *1 (100/200VAC)	Output power *1 (100/200VAC)
European terminal	UDP-120-A24-E00-B	+24V	5A (8.4A/12.5A)	120W (201.6W/300W)
Screw terminal	UDP-120-A24-T00-B	+24V	5A (8.4A/12.5A)	120W (201.6W/300W)
European terminal (supports capacitor unit)	UDP-120-A24-EB0-B	+24V	5A (8.4A/12.5A)	120W (201.6W/300W)
Screw terminal (supports capacitor unit)	UDP-120-A24-TB0-B	+24V	5A (8.4A/12.5A)	120W (201.6W/300W)
European terminal (with service life indicator)	UDP-120-A24-E0X-B	+24V	5A (8.4A/12.5A)	120W (201.6W/300W)
Screw terminal (with service life indicator)	UDP-120-A24-T0X-B	+24V	5A (8.4A/12.5A)	120W (201.6W/300W)

■ Model name coding

UDP-120-A**-****-*

① ② ③ ④ ⑤⑥⑦⑧ ⑨

① Series name
② Output power
③ Arrestor A:With arrestor
④ 24:24V
⑤ Input/Output terminal type E:European terminal T:Screw terminal
⑥ Connector for backup (DS01A) 0:without connector B:with connector
⑦ Service life indicator 0:Without service life indicator X:With service life indicator
⑧ Modification Blank: standard
⑨ DIN-rail Blank:Without DIN-rail bracket B:With DIN-rail bracket

*1 Values in ( ) above show peak current and power.

Features

- It is not necessary to install an external noise filter because of low noise (supports VCCI Class B).
- The built-in arrestor to avoid/mitigate the risk of lightning damage
- Able to start-up at -40°C environment
- The PCB is coated as standard specification
- European terminal type and screw terminal type are available.
- Equipped with a variable resistor to adjust output voltage
- Model with a service life indicator will be added.
- Model with a backup function for momentary power failure will be added.
- Backup for blackout

Safety standard	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

* Various safety standards will be certified.

●Function

TTL PFC RoHS Directive

●Input

AC input	85-264V AC (Worldwide range)

●Dimension

W×H×D (mm)	with DIN-rail bracket 35×124×117.5

High efficiency 92%*
(*At 230V AC input)

300W* peak power, approx. 250% higher than continuous rated power
(*At 200V AC input)

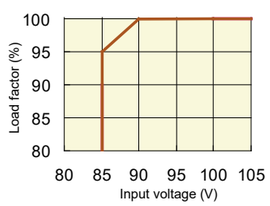
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items		Specification	Measurements conditions, etc.
AC Input	Rated Voltage		100-240VAC (85*-264VAC)	Worldwide range *See <Fig.1> Low input voltage derating below.
	Input Frequency		50-60Hz	Frequency range 47-63Hz
	Efficiency	115VAC	90.5% typ	At rated output *Characteristic data: Fig.4
		230VAC	92.0% typ	
	Power Factor	115VAC	99% typ	At rated output *Characteristic data: Fig.5
		230VAC	88% typ	
	Inrush Current		20A typ (115VAC), 41A typ (230VAC) *Characteristic data: Fig.6	Power thermistor system at cold start (25°C)
	Input Current	115VAC	1.16A typ	At rated output *Characteristic data: Fig.4
		230VAC	0.64A typ	
Output	Rated Voltage		+24V	
	Continuous Rated Output		5.0A	At rated input Refer to <Fig.3> output derating.
			120W	
	Peak Current/Power	100VAC	8.4A	*Refer to rated input/output voltage and <Fig.2> *Follow Peak output power condition below.
			201.6W*	
		200VAC	12.5A	
			300W*	
	Factory Setting		24V±2%	At continuous rated output
	Adjustable Voltage Range		22.8V (95%)-28.8V (120%)	
	Static Input Regulation		94mV max.	
	Static Load Regulation		150mV max.	
	Temperature Regulation		0.02%/°C max.	
	Max. Ripple Voltage	0-70°C	120mVp-p max.	Connect 150mm max. lead wire to output connectors, and then connect a 10uF electrolytic capacitor with a 0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band.
		-10 to 0°C	160mVp-p max.	
		-20 to -10°C	240mVp-p max.	
	Max. Spike Voltage	0 to 70°C	150mVp-p max.	
		-10 to 0°C	180mVp-p max.	
		-20 to -10°C	300mVp-p max.	
Protection	Over Current Protection	OCP point (A)	101% min. of peak rated current	
		Method	Blocking oscillation *Characteristic data: Fig.18	
		Recovery	Automatic recovery	
	Over Voltage Protection	OVP point (V)	30.0-36.0V	
		Method	Output shutdown (latch lock)	
		Recovery	Reclosing of AC input	
Environment	Operating Temp./Humidity		-20 to 70°C (able to start-up at -40°C)*/20-90% *1	*Refer to <Fig.3> output derating. There shall be no condensation
	Storage Temp./Humidity		-30 to 85°C/10 to 95%	There shall be no condensation
	Vibration		To endure the acceleration of 2G, vibration frequency of 10 to 55Hz and 10 sweep cycles in each X, Y, Z direction (in each 1 hour).	JIS-C-60068-2-6 at no operation
	Mechanical Shock		Lift one bottom edge 50mm high with the opposite edge placed on a test bench, and let it fall. Repeat 3 times on the other three edges as well, and no malfunction shall be observed.	JIS-C-60068-2-31 at no operation
Insulation	Dielectric Strength		1.5kVAC/1minute between input and output *2	Cut-off current 10mA
			1.5kVAC/1minute between input and FG *2	Cut-off current 10mA
			500VAC/1minute between each output/FG	Cut-off current 100mA
	Insulation Resistance		50MΩ min. between input/output/FG	At 500VDC
	Leakage Current		0.12mA typ (100VAC), 0.24mA typ (200VAC) *Characteristic data: Fig.7	
EMC	Line Noise Immunity		±2000V (pulse width of 100/1000nS,cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)	There shall be no fluctuation of DC output or malfunction.
	Electrostatic Discharge		EN61000-4-2 compliant	Apply to FG and case. There shall be no malfunction, nor failure.
	Radiated, Radio-Frequency Electromagnetic Field		EN61000-4-3 compliant	
	Fast Transient Burst		EN61000-4-4 compliant	
	Lightning Surge		EN61000-4-5 compliant	
	Radio Frequency Conducted Immunity		EN61000-4-6 compliant	
	Power-Frequency Magnetic Field Immunity		EN61000-4-8 compliant	
	Voltage dips/Regulation		EN61000-4-11 compliant	
	Conducted Emmision		VCCI-B, FCC-B, CISPR22-B, EN55022-B compliant *Characteristic data: Fig.8, 9	At rated input and rated output
	Harmonic Current Regulations		IEC61000-3-2 (edition 2.1) classA, EN61000-3-2 (A14) classA compliant	At rated input/output
Others	Safety Standards		UL62368-1, CSA62368-1 (c-UL), UL508 compliant, PSE (ordinance clause 2) compliant	
	SEMI Standard		SEMI-F47 compliant	At 200-240VAC input
	Cooling System		Convection cooling	
	Output Grounding		Capacitor grounding	
	Output Hold-up Time		Refer to <Fig.14> Output Hold-up Time vs. Output Power	*Characteristic data: Fig.14
	Reliability Grade		FA (Industrial equipment grade to use double-sided PCB with plated through hole)	Following our standard
	Weight		520g typ	With DIN-rail bracket
	Warranty		Three years after delivery: If the defect is our responsibility, the defective unit shall be repaired or replaced at our cost.	Except for operation out of the specification.

*1 When startup is performed at -15°C or lower, it may take several seconds until output voltage becomes stable. Before using this product, evaluate it using an actual machine.
*2 The original dielectric strength between the input and output terminals is 3 kV AC for 1 minute. However, because an arrestor is mounted between the input terminal and frame ground (FG), the actual dielectric strength between them is 1.5 kV AC for 1 minute.

<Fig.1> Low input voltage derating

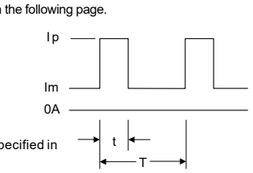
Follow the derating below to derate rated current/power.



Peak output power condition

- Duty ratio of peak current shall be 30% or less.
- Energized period of peak current shall be 10 seconds or less.
- In the case that the ambient temperature is 40°C or higher with convection cooling, the energized period of peak current shall be 5 seconds or less.
- The value resulting from the formula below shall not exceed the continuous rated current, Io, after derating specified in the clause, "Output derating" on the following page.

$\sqrt{((Ip^2 \times D)+(Im^2 \times (1-D)))} \leqq Io$
Ip=Peak current value
Im= Peak current value
D= Duty cycle, t/T
t= Pulse width of peak current
T=Cycle
Io= Continuous rated current specified in output derating.

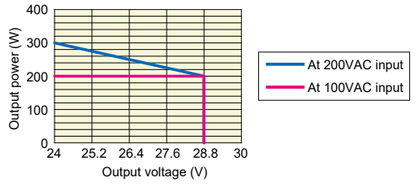


(Note) If the temperature of the power thermistor for limiting inrush current does not rise enough (and its resistance value is too large), such as when the normal average load power is small, the output voltage at peak output might drop about 100 ms. If this might cause any problem, please check the output voltage waveform while the power supply is installed on an actual device at operation.

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<Fig.2> Peak output derating

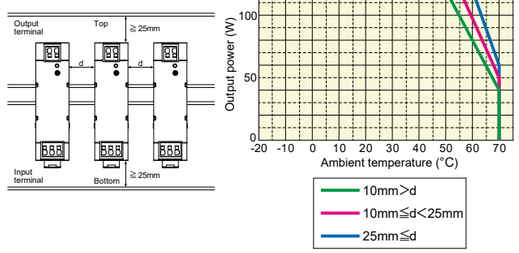
Use this product by reducing the peak power according to the preset output voltage, as shown in the derating diagram shown below.



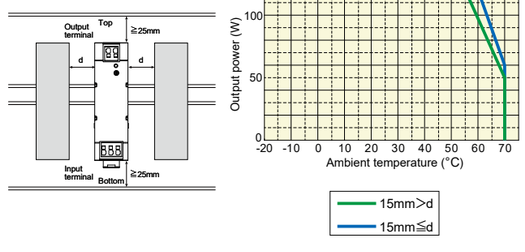
<Fig.3> Installation/Output derating

Follow the derating diagram below for output according to ambient temperature and installation direction.
When installing on a DIN-rail, make sure that there is at least 25 mm space above and below the product. In addition, derate the output according to the distance between two adjacent products as shown in the derating diagram shown below.
The ambient temperature during installation on a DIN-rail means the temperature at the position where convecting air enters the power supply.
* The heat source is assumed to be the power supply of the same model operating at the same power.

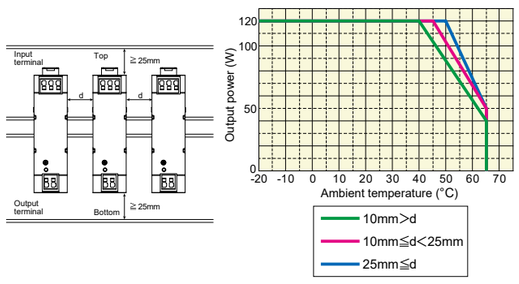
Installation direction A When the adjacent devices are heat sources



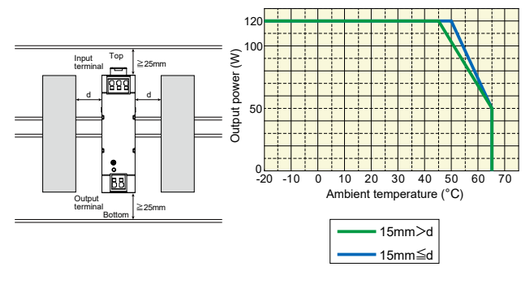
Installation direction A When the adjacent devices are not heat sources



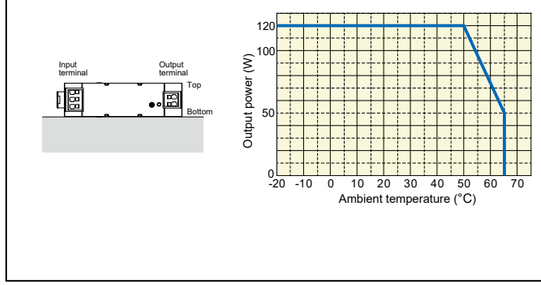
Installation direction B When the adjacent devices are heat sources



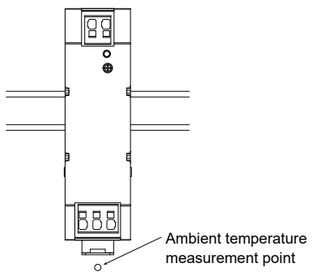
Installation direction B When the adjacent devices are not heat sources



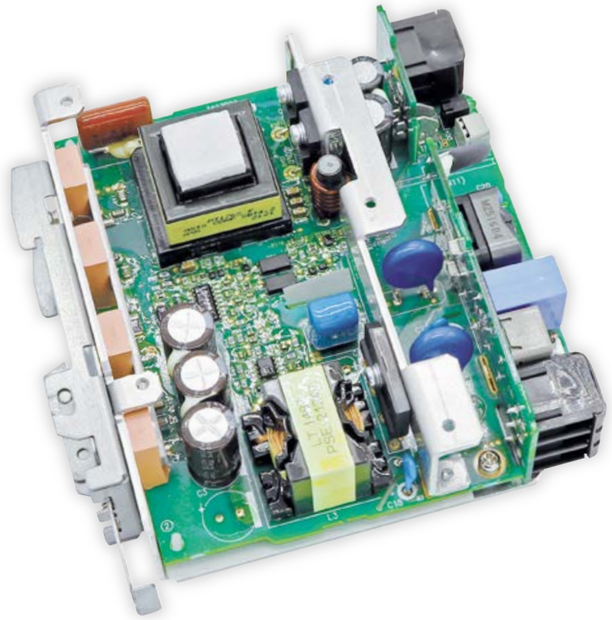
Installation direction C



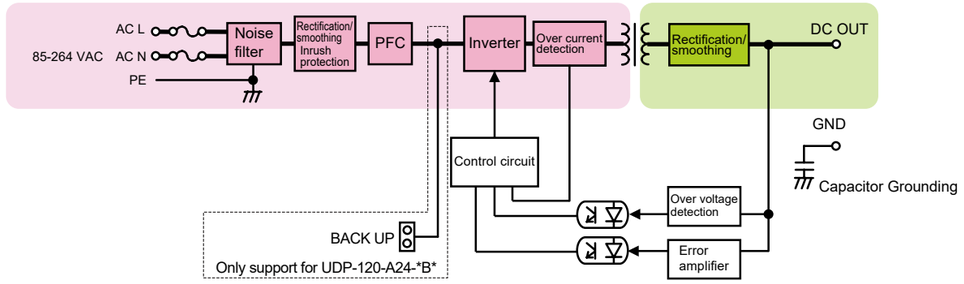
Ambient temperature measurement point



Internal structure

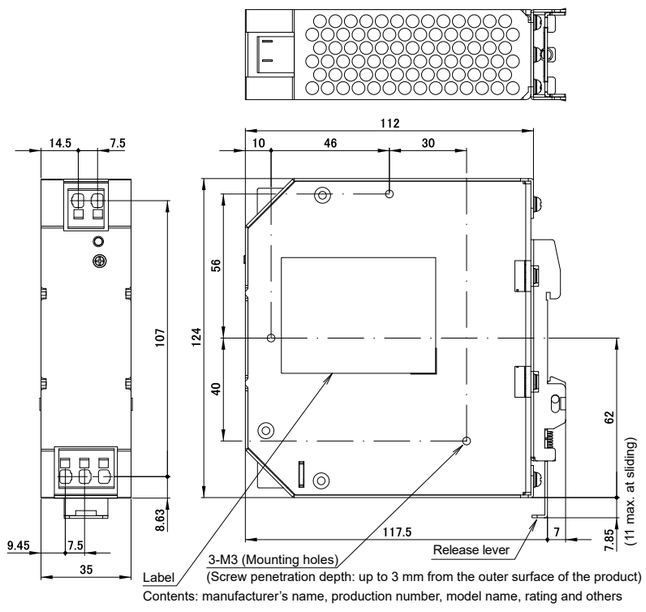


Block Diagram



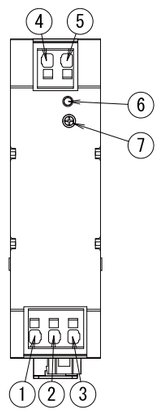
Outline Drawing

European terminal (UDP-120-A**-E00-B)



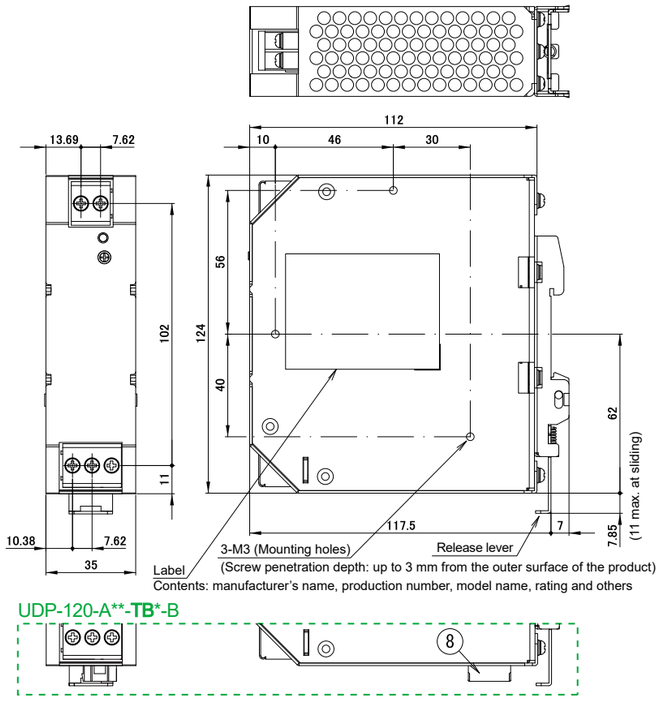
UDP-120-A**-**EB***-B

*Connector pin allocation



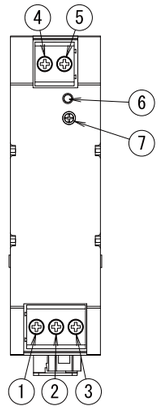
No.	Name	Function
①	AC(L)	Input terminal
②	AC(N)	
③	PE	Protective ground terminal
④	+VOUT	+ Output terminal
⑤	-VOUT	- Output terminal
⑥	PWR_OK	Output voltage confirmation LED
⑦	ADJ	Variable resistor to adjust output voltage
⑧	BACK UP	Backup connector

Screw terminal block (UDP-120-A**-T00-B)



UDP-120-A**-**TB***-B

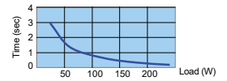
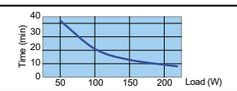
*Connector pin allocation



No.	Name	Function
①	AC(L)	Input terminal
②	AC(N)	
③	PE	Protective ground terminal
④	+VOUT	+ Output terminal
⑤	-VOUT	- Output terminal
⑥	PWR_OK	Output voltage confirmation LED
⑦	ADJ	Variable resistor to adjust output voltage
⑧	BACK UP	Backup connector

●Dimensional tolerance: ± 1 (± 0.5 for mounting dimension)

Options (Sold separately)

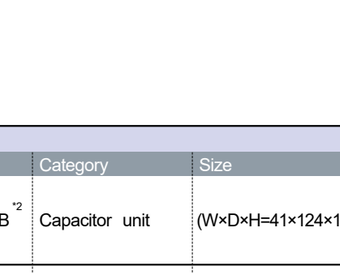
Capacitor unit / Battery unit				
Photos	Model	Category	Size	Backup time *1
	DS01A-EC400/172F-B *2	Capacitor unit	(W×D×H=41×124×117.5mm)	
	DS02A-L24/2.5L-B	Battery unit	(W×D×H=41×124×117.5mm)	

*1 Backup time is a reference value at initial use. It is not a guaranteed value.
*2 DS01A-EC400/172F is connectable only for UDP-120-A**-*B* (backup model for momentary power failure).

Cable			
Photos	Model	Category	Description
	WH-02SPC02SPC-250	Harness for connecting capacitor unit	Connection harness for connecting the capacitor unit (DS01A-EC400/172F). (Length: 250mm)
	WH-02SPC02SPC-500	Harness for connecting capacitor unit	Connection harness for connecting the capacitor unit (DS01A-EC400/172F). (Length: 500mm)
	WH-02SPC02SPC-250-01	Harness for connecting capacitor unit	Connection harness for connecting the 2 capacitor units (DS01A-EC400/172F).

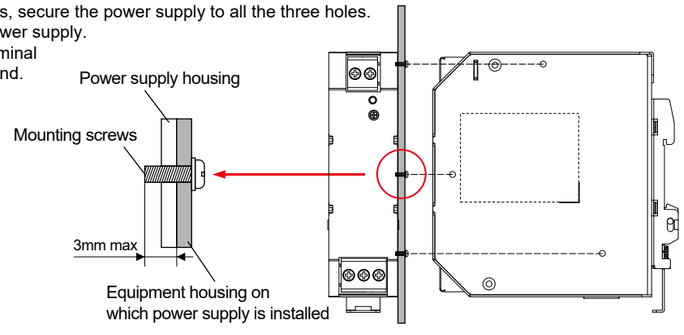
Attach to or Detach from a DIN-Rail

To attach the product to a DIN-rail, hook part 1 (shown below) first and then push the product in the direction indicated by the arrow until it snaps in. To detach the product from a DIN-rail, pull down part 2 first and then remove the product.



Power Supply Mounting Screws and Grounding

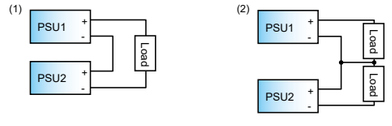
When using the power supply mounting holes, secure the power supply to all the three holes.
Use 3-mm-diameter screws to secure the power supply.
Be sure to connect the protective ground terminal
on the input terminal block to the safety ground.



Connection in Series and Parallel

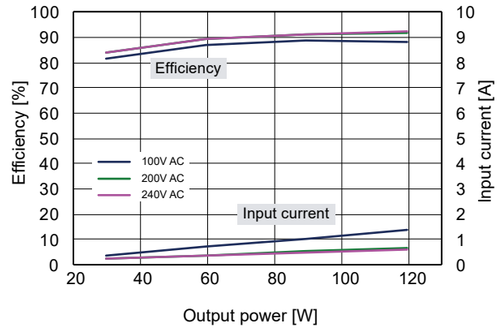
■ Series operation
Series connection is available as in figure (1) and (2) on the right.

■ Parallel operation
Parallel operation is not possible.

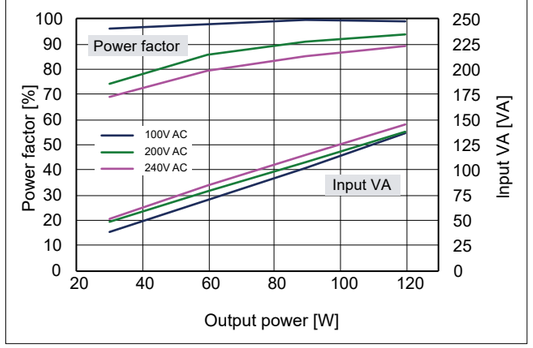


Characteristics Data (Typical features of the product series) UDP-120-A24 (Examples of actual measurement)

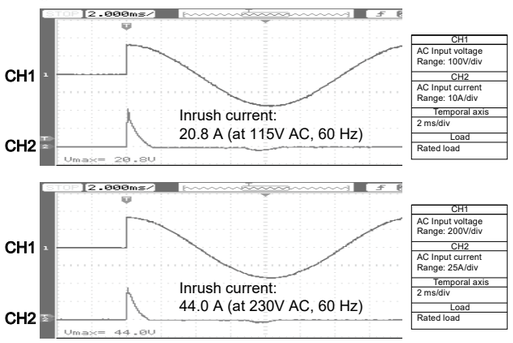
● Fig.4 Efficiency/Input Current vs. Output Power



● Fig.5 Power Factor/Input VA vs. Output Power



● Fig.6 Inrush Current



● Fig.7 Leakage Current

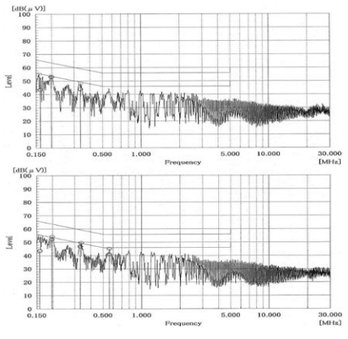
Input : 100, 200V AC
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.11mA	0.12mA
200V AC	0.23mA	0.23mA

● Fig.8 Conducted Emission at 100V AC

Input : 100V AC
Load : Rated
Mode : Peak

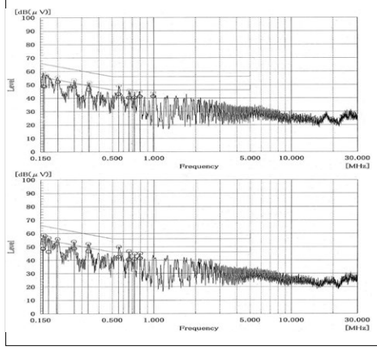
VCCI Class B



● Fig.9 Conducted Emission at 230V AC

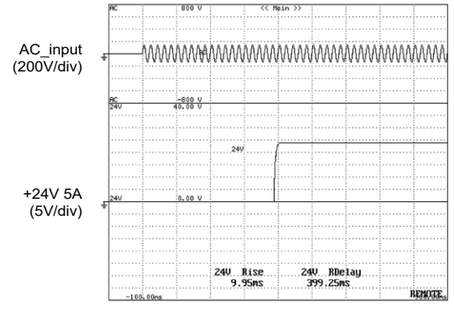
Input : 230V AC
Load : Rated
Mode : Peak

VCCI Class B



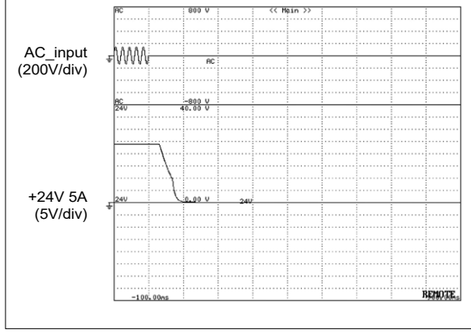
● Fig.10 Rising Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



● Fig.11 Falling Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV

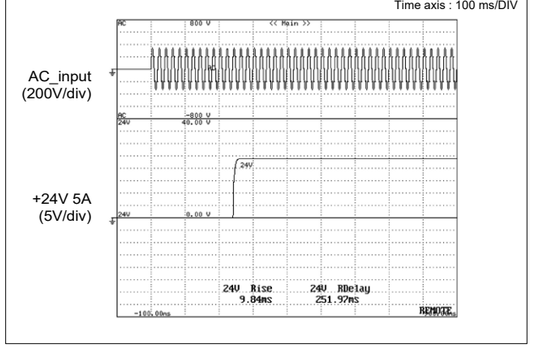


UDP-120 Series

Characteristics Data (Typical features of the product series) UDP-120-A24 (Examples of actual measurement)

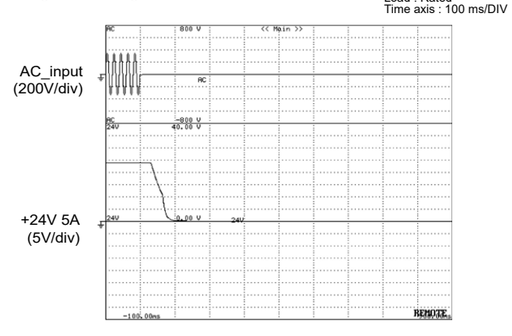
● Fig.12 Rising Characteristics at 240V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV

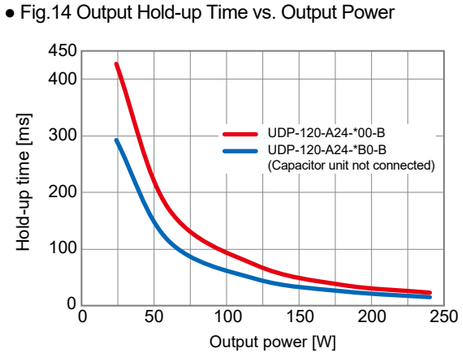


● Fig.13 Falling Characteristics at 240V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



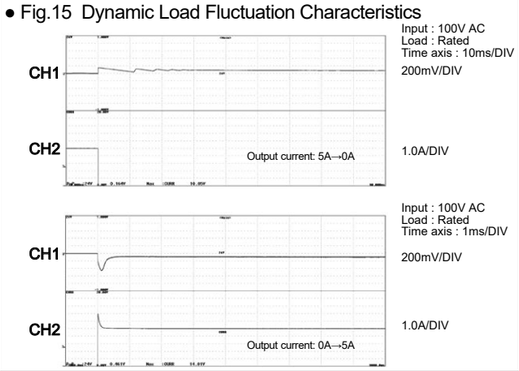
● Fig.14 Output Hold-up Time vs. Output Power



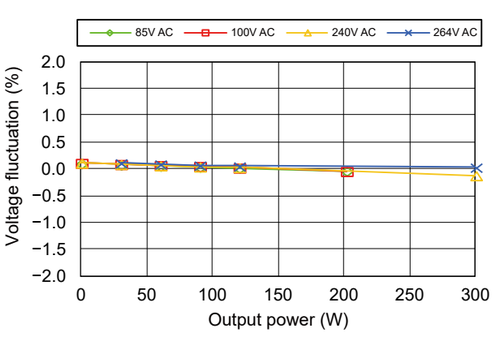
● Fig.15 Dynamic Load Fluctuation Characteristics

Input : 100V AC
Load : Rated
Time axis : 10ms/DIV
200mV/DIV
1.0A/DIV
Output current: 5A→0A

Input : 100V AC
Load : Rated
Time axis : 1ms/DIV
200mV/DIV
1.0A/DIV
Output current: 0A→5A



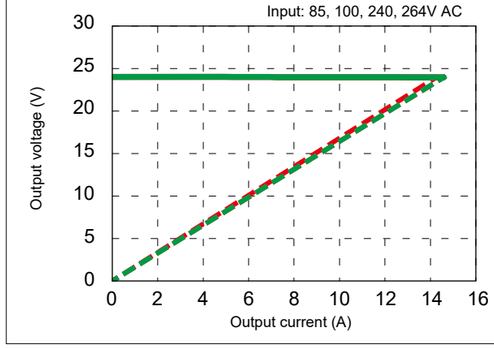
● Fig.16 Output Voltage Regulation (Load Fluctuation)



● Fig.17 Ripple and Spike Voltage

Temperature	AC Input voltage	CH1 24V					
		Minimum load		50% load		Rated load	
		Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)
-25℃	85V	38.2	56.3	136.8	157.7	180.7	202.5
	100V	38.9	57.9	132.7	151.9	180.6	203.8
	240V	42.2	60.9	129.2	144.8	173.5	200.0
	264V	45.5	68.0	127.9	145.8	182.4	206.2
25℃	85V	6.3	18.8	20.3	31.7	27.5	40.5
	100V	5.1	17.3	20.7	31.6	27.8	39.7
	240V	4.6	16.6	21.1	31.2	27.9	36.9
	264V	5.2	17.0	21.4	31.4	29.1	37.9
65℃	85V	8.1	19.3	12.4	24.7	20.7	35.4
	100V	8.1	19.3	12.3	24.0	20.6	35.2
	240V	7.8	19.0	12.1	23.0	20.7	30.8
	264V	8.7	19.9	12.5	23.6	21.3	30.6
75℃	85V	3.8	20.0	6.4	22.4	7.8	28.4
	100V	4.1	19.5	6.4	21.8	7.7	28.6
	240V	6.4	20.7	6.2	22.4	7.0	24.3
	264V	6.4	20.7	6.2	22.4	7.0	24.7

●Fig.18 Overcurrent Protection Characteristics (V - I Characteristics)



Single Output Power Supply UDP-180 series

Input/Output terminal type	Model	Output voltage	Output current *1 (100/200VAC)	Output power *1 (100/200VAC)
European terminal	UDP-180-A24-E00-B	+24V	7.5A (8.4A/12.5A)	180W (201.6W/300W)
Screw terminal	UDP-180-A24-T00-B	+24V	7.5A (8.4A/12.5A)	180W (201.6W/300W)
European terminal (supports capacitor unit)	UDP-180-A24-EB0-B	+24V	7.5A (8.4A/12.5A)	180W (201.6W/300W)
Screw terminal (supports capacitor unit)	UDP-180-A24-TB0-B	+24V	7.5A (8.4A/12.5A)	180W (201.6W/300W)
European terminal (with service life indicator)	UDP-180-A24-E0X-B	+24V	7.5A (8.4A/12.5A)	180W (201.6W/300W)
Screw terminal (with service life indicator)	UDP-180-A24-T0X-B	+24V	7.5A (8.4A/12.5A)	180W (201.6W/300W)

■ Model name coding

UDP-180-A**-****-*

① ② ③ ④ ⑤⑥⑦⑧ ⑨

① Series name
② Output power
③ Arrestor A:With arrestor
④ 24:24V
⑤ Input/Output terminal type E:European terminal T:Screw terminal
⑥ Connector for backup (DS01A) 0:without connector B:with connector
⑦ Service life indicator 0:Without service life indicator X:With service life indicator
⑧ Modification
⑨ DIN-rail Blank:Without DIN-rail bracket B:With DIN-rail bracket

*1 Values in ( ) above show peak current and power.

Features

- It is not necessary to install an external noise filter because of low noise (supports VCCI Class B).
- The built-in arrestor to avoid/mitigate the risk of lightning damage
- Able to start-up at -40°C environment
- The PCB is coated as standard specification.
- European terminal type and screw terminal type are available
- Equipped with a variable resistor to adjust output voltage
- Model with a service life indicator will be added.
- Model with a backup function for momentary power failure will be added.
- Backup for blackout

Safety standard	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

* Various safety standards will be certified.

●Function

TTL PFC RoHS Directive

●Input

AC input	85-264V AC (Worldwide range)

●Dimension

W×H×D (mm)	with DIN-rail bracket 35×124×117.5

High efficiency 93.5%*
(*At 230V AC input)

300W* peak power, approx. 160% higher than continuous rated power
(*At 200V AC input)

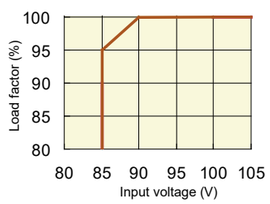
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items		Specification	Measurements conditions, etc.
AC Input	Rated Voltage		100-240VAC (85*-264VAC)	Worldwide range *See <Fig.1> Low input voltage derating below.
	Input Frequency		50-60Hz	Frequency range 47-63Hz
	Efficiency	115VAC	91.5% typ	At rated output *Characteristic data: Fig.4
		230VAC	93.5% typ	
	Power Factor	115VAC	99% typ	At rated output *Characteristic data: Fig.5
		230VAC	93% typ	
	Inrush Current		20A typ (115VAC), 41A typ (230VAC) *Characteristic data: Fig.6	Power thermistor system at cold start (25°C)
	Input Current	115VAC	1.73A typ	At rated output *Characteristic data: Fig.4
		230VAC	0.9A typ	
Output	Rated Voltage		+24V	
	Continuous Rated Output		7.5A	At rated input Refer to <Fig.3> output derating.
			180.0W	
	Peak Current/Power	100VAC	8.4A	*Refer to rated input/output voltage and <Fig.2> *Follow Peak output power condition below.
			201.6W*	
		200VAC	12.5A	
			300W*	
	Factory Setting		24V±2%	At continuous rated output
	Adjustable Voltage Range		22.8V (95%)-28.8V (120%)	
	Static Input Regulation		94mV max.	
	Static Load Regulation		150mV max.	
	Temperature Regulation		0.02%/°C max.	
	Max. Ripple Voltage	0-70°C	120mVp-p max.	Connect 150mm max. lead wire to output connectors, and then connect a 10uF electrolytic capacitor with a 0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band. *1
		-10 to 0°C	160mVp-p max.	
		-20 to -10°C	240mVp-p max.	
	Max. Spike Voltage	0 to 70°C	150mVp-p max.	
		-10 to 0°C	180mVp-p max.	
		-20 to -10°C	300mVp-p max.	
Protection	Over Current Protection	OCP point (A)	101% min. of peak rated current	
		Method	Blocking oscillation *Characteristic data: Fig.18	
		Recovery	Automatic recovery	
	Over Voltage Protection	OVP point (V)	30.0-36.0V	
		Method	Output shutdown (latch lock)	
		Recovery	Reclosing of AC input	
Environment	Operating Temp./Humidity		-20 to 70°C (able to start-up at -40°C)*/20-90% *2	*Refer to <Fig.3> output derating. There shall be no condensation
	Storage Temp./Humidity		-30 to 85°C/10 to 95%	There shall be no condensation
	Vibration		To endure the acceleration of 2G, vibration frequency of 10 to 55Hz and 10 sweep cycles in each X, Y, Z direction (in each 1 hour).	JIS-C-60068-2-6 at no operation
	Mechanical Shock		Lift one bottom edge 50mm high with the opposite edge placed on a test bench, and let it fall. Repeat 3 times on the other three edges as well, and no malfunction shall be observed.	JIS-C-60068-2-31 at no operation
Insulation	Dielectric Strength		1.5kVAC/1minute between input and output *3	Cut-off current 10mA
			1.5kVAC/1minute between input and FG *3	Cut-off current 10mA
			500VAC/1minute between each output/FG	Cut-off current 100mA
	Insulation Resistance		50MΩmin. between input/output/FG	At 500VDC
	Leakage Current		0.12mA typ (100VAC), 0.24mA typ (200VAC) *Characteristic data: Fig.7	
EMC	Line Noise Immunity		±2000V (pulse width of 100/1000nS,cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)	There shall be no fluctuation of DC output or malfunction.
	Electrostatic Discharge		EN61000-4-2 compliant	Apply to FG and case. There shall be no malfunction, nor failure.
	Radiated, Radio-Frequency Electromagnetic Field		EN61000-4-3 compliant	
	Fast Transient Burst		EN61000-4-4 compliant	
	Lightning Surge		EN61000-4-5 compliant	
	Radio Frequency Conducted Immunity		EN61000-4-6 compliant	
	Power-Frequency Magnetic Field Immunity		EN61000-4-8 compliant	
	Voltage dips/Regulation		EN61000-4-11 compliant	
	Conducted Emmision		VCCI-B, FCC-B, CISPR22-B, EN55022-B compliant *Characteristic data: Fig.8, 9	At rated input/output
	Harmonic Current Regulations		IEC61000-3-2 (edition 2.1) classA, EN61000-3-2 (A14) classA compliant	At rated input/output
Others	Safety Standards		UL62368-1, CSA62368-1 (c-UL), UL508 compliant, PSE (ordinance clause 2) compliant	
	SEMI Standard		SEMI-F47 compliant	At 200-240VAC input
	Cooling System		Convection cooling	
	Output Grounding		Capacitor grounding	
	Output Hold-up Time		Refer to <Fig.14> Output Hold-up Time vs. Output Power	*Characteristic data: Fig.14
	Reliability Grade		FA (Industrial equipment grade to use double-sided PCB with plated through hole)	Following our standard
	Weight		520g typ	With DIN-rail bracket
	Warranty		Three years after delivery: If the defect is our responsibility, the defective unit shall be repaired or replaced at our cost.	Except for operation out of the specification.

*1 Regarding the model with the backup connector, the specifications are based on the condition that it is connected to a capacitor unit.
*2 When startup is performed at -15°C or lower, it may take several seconds until output voltage becomes stable. Before using this product, evaluate it using an actual machine.
*3 The original dielectric strength between the input and output terminals is 3kV AC for 1 minute. However, because an arrestor is mounted between the input terminal and frame ground (FG), the actual dielectric strength between them is 1.5kV AC for 1 minute.

<Fig.1> Low input voltage derating

Follow the derating below to derate rated current/power.

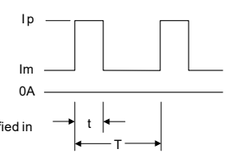


Peak output power condition

- Duty ratio of peak current shall be 30% or less.
- Energized period of peak current shall be 10 seconds or less.
- In the case that the ambient temperature is 40°C or higher with convection cooling, the energized period of peak current shall be 5 seconds or less.
- The value resulting from the formula below shall not exceed the continuous rated current, Io, after derating specified in the clause, "Output derating" on the following page.

$\sqrt{((Ip^2 \times D)+(Im^2 \times (1-D)))} \leqq Io$

Ip=Peak current value
Im= Peak current value
D= Duty cycle, t/T
t= Pulse width of peak current
T=Cycle
Io= Continuous rated current specified in output derating.

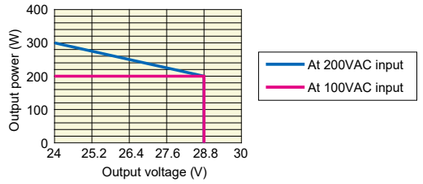


(Note) If the temperature of the power thermistor for limiting inrush current does not rise enough (and its resistance value is too large), such as when the normal average load power is small, the output voltage at peak output might drop about 100 ms. If this might cause any problem, please check the output voltage waveform while the power supply is installed on an actual device at operation.

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<Fig.2> Peak output derating

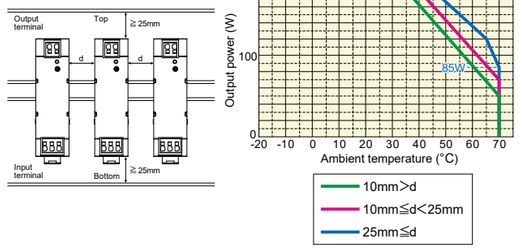
Use this product by reducing the peak power according to the preset output voltage, as shown in the derating diagram shown below.



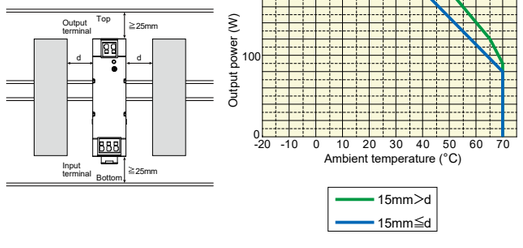
<Fig.3> Installation/Output derating

Follow the derating diagram below for output according to ambient temperature and installation direction.
When installing on a DIN-rail, make sure that there is at least 25 mm space above and below the product. In addition, derate the output according to the distance between two adjacent products as shown in the derating diagram shown below.
The ambient temperature during installation on a DIN-rail means the temperature at the position where convecting air enters the power supply.
* The heat source is assumed to be the power supply of the same model operating at the same power.

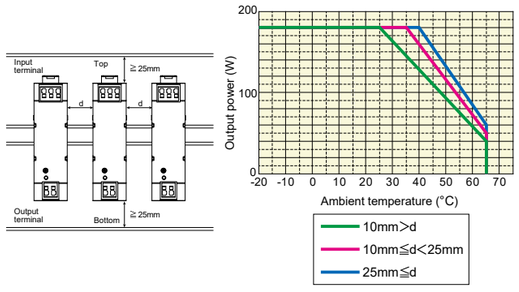
Installation direction A When the adjacent devices are heat sources



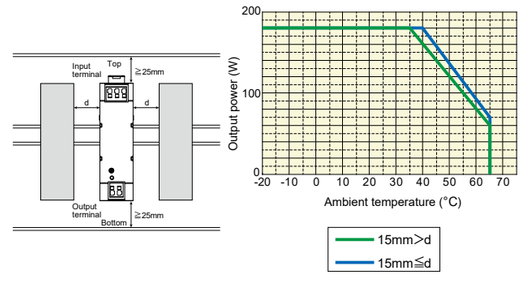
Installation direction A When the adjacent devices are not heat sources



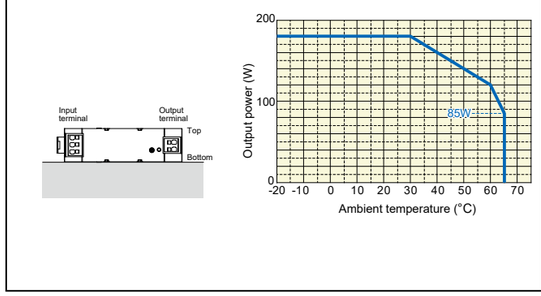
Installation direction B When the adjacent devices are heat sources



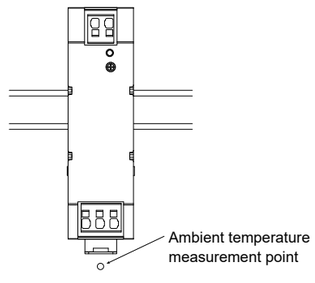
Installation direction B When the adjacent devices are not heat sources



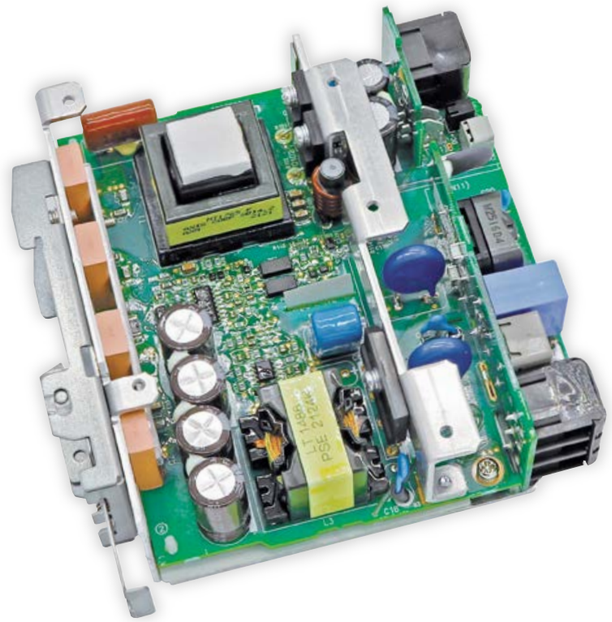
Installation direction C



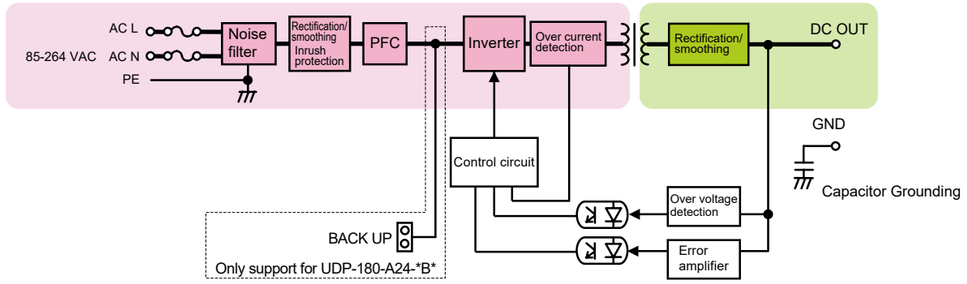
Ambient temperature measurement point



Internal structure

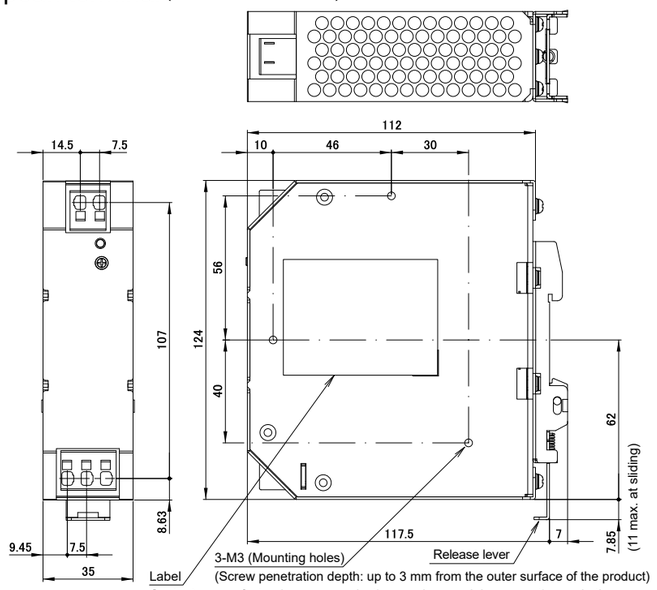


Block Diagram

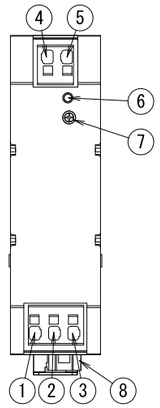


Outline Drawing

European terminal (UDP-180-A**-E00-B)



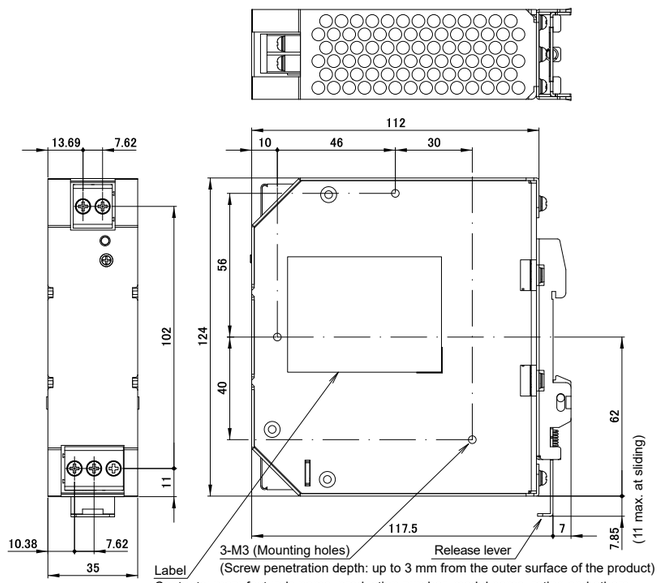
*Connector pin allocation



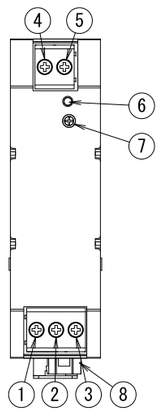
No.	Name	Function
①	AC(L)	Input terminal
②	AC(N)	
③	PE	Protective ground terminal
④	+VOUT	+ Output terminal
⑤	-VOUT	- Output terminal
⑥	PWR_OK	Output voltage confirmation LED
⑦	ADJ	Variable resistor to adjust output voltage
⑧	BACK UP	Backup connector

UDP-180-A**-**EB***-B

Screw terminal block (UDP-180-A**-T00-B)



*Connector pin allocation



No.	Name	Function
①	AC(L)	Input terminal
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③	PE	Protective ground terminal
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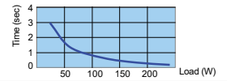
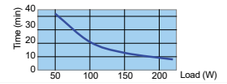
⑤	-VOUT	- Output terminal
⑥	PWR_OK	Output voltage confirmation LED
⑦	ADJ	Variable resistor to adjust output voltage
⑧	BACK UP	Backup connector

UDP-180-A**-**TB***-B

●Dimensional tolerance: ± 1 (± 0.5 for mounting dimension)

Options (Sold separately)

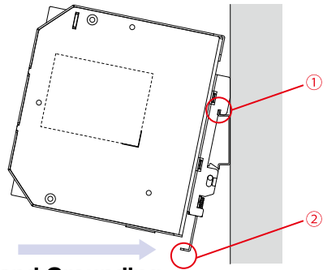
Capacitor unit / Battery unit				
Photos	Model	Category	Size	Backup time *1
	DS01A-EC400/172F-B*2	Capacitor unit	(W×D×H=41×124×117.5mm)	
	DS02A-L24/2.5L-B	Battery unit	(W×D×H=41×124×117.5mm)	

*1 Backup time is a reference value at initial use. It is not a guaranteed value.
*2 DS01A-EC400/172F is connectable only for UDP-180-A**-*B* (backup model for momentary power failure).

Cable			
Photos	Model	Category	Description
	WH-02SPC02SPC-250	Harness for connecting capacitor unit	Connection harness for connecting the capacitor unit (DS01A-EC400/172F). (Length: 250mm)
	WH-02SPC02SPC-500	Harness for connecting capacitor unit	Connection harness for connecting the capacitor unit (DS01A-EC400/172F). (Length: 500mm)
	WH-02SPC02SPC-250-01	Harness for connecting capacitor unit	Connection harness for connecting the 2 capacitor units (DS01A-EC400/172F).

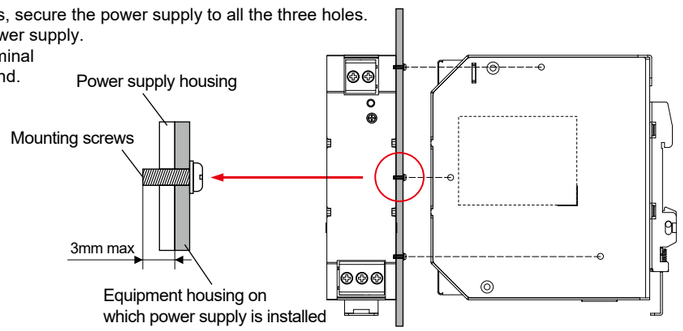
Attach to or Detach from a DIN-Rail

To attach the product to a DIN-rail, hook part 1 (shown below) first and then push the product in the direction indicated by the arrow until it snaps in. To detach the product from a DIN-rail, pull down part 2 first and then remove the product.



Power Supply Mounting Screws and Grounding

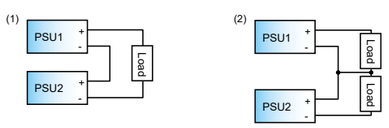
When using the power supply mounting holes, secure the power supply to all the three holes.
Use 3-mm-diameter screws to secure the power supply.
Be sure to connect the protective ground terminal
on the input terminal block to the safety ground.



Connection in Series and Parallel

■ Series operation
Series connection is available as in figure (1) and (2) on the right.

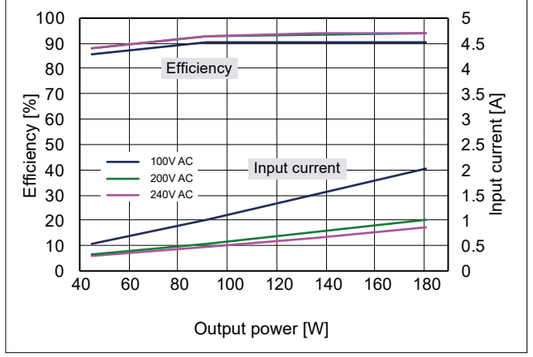
■ Parallel operation
Parallel operation is not possible.



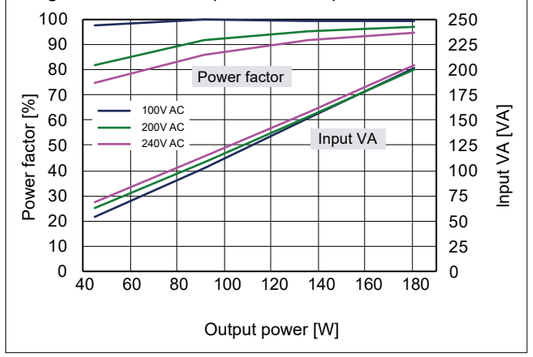
UDP-180 Series

Characteristics Data (Typical features of the product series) UDP-180-A24 (Examples of actual measurement)

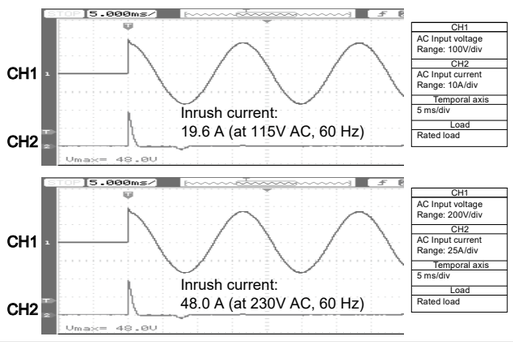
● Fig.4 Efficiency/Input Current vs. Output Power



● Fig.5 Power Factor/Input VA vs. Output Power



● Fig.6 Inrush Current



● Fig.7 Leakage Current

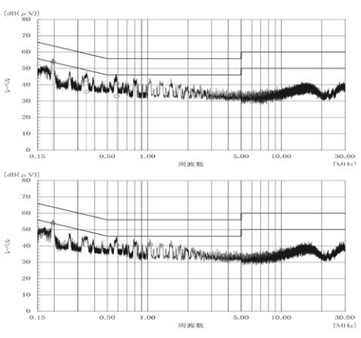
Input : 100, 200V AC
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.11mA	0.12mA
200V AC	0.23mA	0.23mA

● Fig.8 Conducted Emission at 100V AC

Input : 100V AC
Load : Rated
Mode : Peak

VCCI Class B



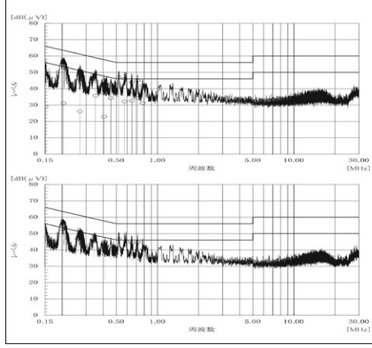
Measuring point: N-FG

Measuring point: L1-FG

● Fig.9 Conducted Emission at 230V AC

Input : 230V AC
Load : Rated
Mode : Peak

VCCI Class B

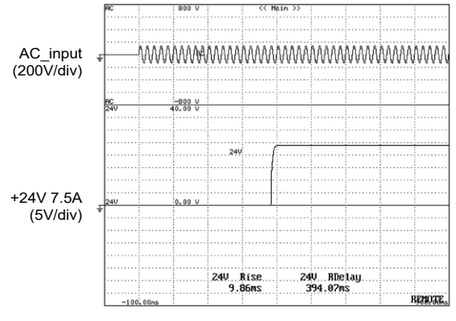


Measuring point: N-FG

Measuring point: L1-FG

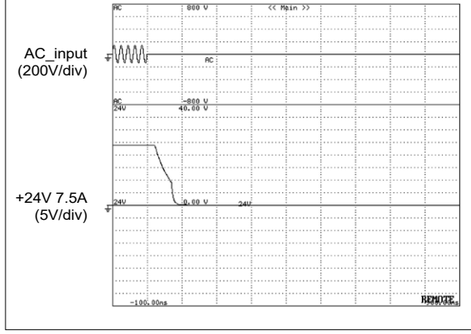
● Fig.10 Rising Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



● Fig.11 Falling Characteristics at 100V AC

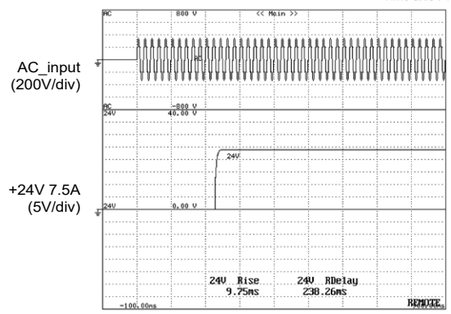
Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



Characteristics Data (Typical features of the product series) UDP-180-A24 (Examples of actual measurement)

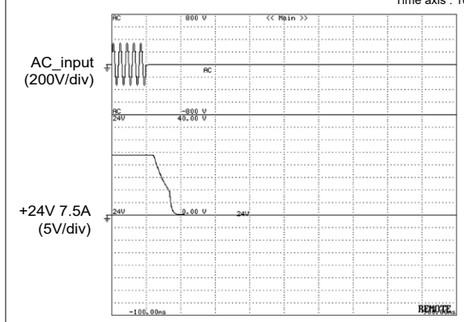
● Fig.12 Rising Characteristics at 240V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV

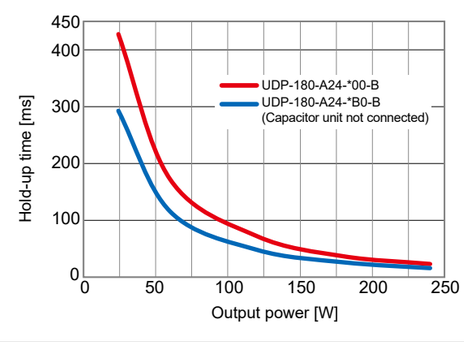


● Fig.13 Falling Characteristics at 240V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



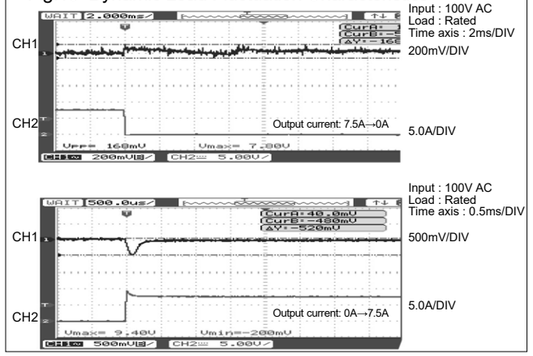
● Fig.14 Output Hold-up Time vs. Output Power



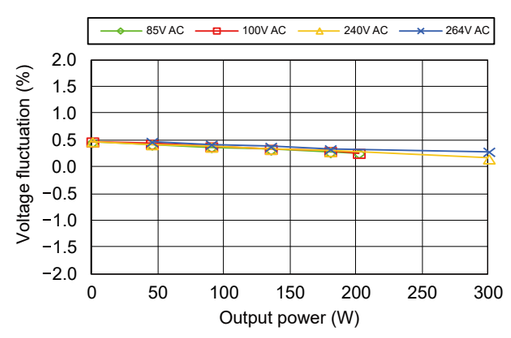
● Fig.15 Dynamic Load Fluctuation Characteristics

Input : 100V AC
Load : Rated
Time axis : 2ms/DIV
200mV/DIV
5.0A/DIV
Output current: 7.5A→0A

Input : 100V AC
Load : Rated
Time axis : 0.5ms/DIV
500mV/DIV
5.0A/DIV
Output current: 0A→7.5A



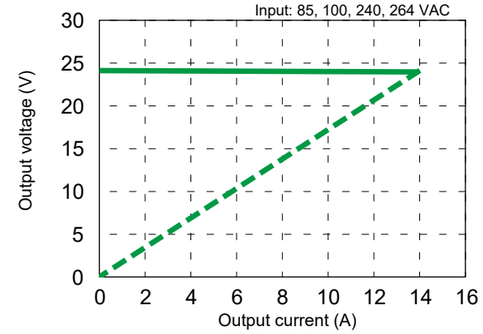
● Fig.16 Output Voltage Regulation (Load Fluctuation)



● Fig.17 Ripple and Spike Voltage

Temperature	AC Input voltage	CH1 24V					
		Minimum load		50% load		Rated load	
		Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)
-25℃	85V	15.5	31.5	118.9	156.7	160.1	196.5
	100V	15.4	31.5	115.4	140.1	142.2	175.4
	240V	15.0	31.2	111.0	132.9	135.2	150.5
	264V	15.0	31.3	111.0	126.9	140.1	154.9
25℃	85V	15.1	26.8	18.0	32.5	30.1	48.0
	100V	17.2	21.4	17.3	30.7	30.1	45.6
	240V	19.5	24.4	17.2	27.3	29.4	39.2
	264V	12.4	27.2	17.8	27.9	29.7	39.2
50℃	85V	10.5	21.7	14.2	28.6	22.4	41.7
	100V	9.5	21.6	13.8	26.1	22.3	39.0
	240V	10.4	23.3	13.5	23.4	21.4	32.8
	264V	10.7	23.6	14.3	23.7	22.0	31.7
75℃	100V	7.8	18.8	8.8	19.5	12.3	24.7
	240V	9.9	21.8	8.8	19.3	12.0	22.1
	264V	10.0	21.9	9.1	19.4	12.5	22.4

●Fig.18 Overcurrent Protection Characteristics (V - I Characteristics)



Single Output Power Supply UDP-240 series

Input/Output terminal type	Model	Output voltage	Output current *1	Output power *1
European terminal	UDP-240-A24-E00-B	+24V	10A (16.7A)	240W (400.8W)
Screw terminal	UDP-240-A24-T00-B	+24V	10A (16.7A)	240W (400.8W)
European terminal(supports capacitor unit)	UDP-240-A24-EB0-B	+24V	10A (16.7A)	240W (400.8W)
Screw terminal(supports capacitor unit)	UDP-240-A24-TB0-B	+24V	10A (16.7A)	240W (400.8W)
European terminal(with service life indicator)	UDP-240-A24-E0X-B	+24V	10A (16.7A)	240W (400.8W)
Screw terminal(service life indicator)	UDP-240-A24-T0X-B	+24V	10A (16.7A)	240W (400.8W)

■ Model name coding

UDP-240-A**-****-*
① ② ③ ④ ⑤⑥⑦⑧ ⑨

① Series name
② Output power
③ Arrestor A:With arrestor
④ 24:24V
⑤ Input/Output terminal type E:European terminal T:Screw terminal
⑥ Connector for backup (DS01A) 0:without connector B:with connector
⑦ Service life indicator 0:Without service life indicator X:With service life indicator
⑧ Modification
⑨ DIN-rail Blank:Without DIN-rail bracket B:With DIN-rail bracket

*1 Values in ( ) above show peak current and power.

Features

- It is not necessary to install an external noise filter because of low noise (supports VCCI Class B).
- The built-in arrestor to avoid/mitigate the risk of lightning damage
- Able to start-up at -40°C environment
- The PCB is coated as standard specification.
- European terminal type and screw terminal type are available.
- Equipped with a variable resistor to adjust output voltage
- Model with a service life indicator will be added.
- Backup for momentary power failures (Dedicated model)
- Backup for blackout

Safety standard	UL	CSA	EN	CE	CCC
Reliability grade	HFA	FA	HOA	OA	

●Function

TTL PFC RoHS Directive

●Input

AC input	85-264V AC (Worldwide range)

* DC input type (UDP-240-HV/24-E00) is available.

●Dimension

W×H×D (mm)	with DIN-rail bracket 41×124×117.5

High efficiency 94%*
(*At 230V AC input, 200W load)

400W peak power, approx. 170% higher than continuous rated power

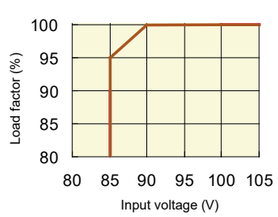
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items		Specification	Measurements conditions, etc.
AC Input	Rated Voltage		100-240VAC (85*-264VAC)	Worldwide range *See <Fig.1> Low input voltage derating below.
	Input Frequency		50-60Hz	Frequency range 47-63Hz
	Efficiency	115VAC	92% typ	At rated output *Characteristic data: Fig.4
		230VAC	94% typ	
	Power Factor	115VAC	99% typ	At rated output *Characteristic data: Fig.5
		230VAC	91% typ (A24-*0*), 93% typ (A24-*B*)	
	Inrush Current		20A typ (115VAC), 41A typ (230VAC) *Characteristic data: Fig.6	Power thermistor system at cold start (25°C)
	Input Current	115VAC	2.3A typ	At rated output *Characteristic data: Fig.4
		230VAC	1.2A typ	
Output	Rated Voltage		+24V	
	Continuous Rated Output		10A	At rated input Refer to <Fig.3> output derating.
			240W	
	Peak Current/Power		16.7A	*Refer to rated input/output voltage and <Fig.2> *Follow Peak output power condition below.
			400.8W*	
	Factory Setting		24V±2%	At continuous rated output
	Adjustable Voltage Range		22.8V (95%)-28.8V (120%)	
	Static Input Regulation		94mV max.	
	Static Load Regulation		150mV max.	
	Temperature Regulation		0.02%/°C max.	
	Max. Ripple Voltage	0-70°C	120mVp-p max.	Connect 150mm max. lead wire to output connectors, and then connect a 10uF electrolytic capacitor with a 0.1uF ceramic capacitor in parallel to the other ends of the wires to measure by an oscilloscope with 100MHz frequency band.
		-10 to 0°C	160mVp-p max.	
		-20 to -10°C	240mVp-p max.	
	Max. Spike Voltage	0 to 70°C	150mVp-p max.	
		-10 to 0°C	180mVp-p max.	
		-20 to -10°C	300mVp-p max.	
Protection	Over Current Protection	OCP point (A)	101% min. of peak rated current	
		Method	Blocking oscillation *Characteristic data: Fig.18	
		Recovery	Automatic recovery	
	Over Voltage Protection	OVP point (V)	30.0-36.0V	
		Method	Output shutdown (latch lock)	
		Recovery	Reclosing of AC input	
Environment	Operating Temp./Humidity		-20 to 70°C (able to start-up at -40°C)*/20-90% *1	*Refer to <Fig.3> output derating. There shall be no condensation
	Storage Temp./Humidity		-30 to 85°C/10-95%	There shall be no condensation
	Vibration		To endure the acceleration of 2G, vibration frequency of 10 to 55Hz and 10 sweep cycles in each X, Y, Z direction (in each 1 hour).	JIS-C-60068-2-6 at no operation
	Mechanical Shock		Lift one bottom edge 50mm high with the opposite edge placed on a test bench, and let it fall. Repeat 3 times on the other three edges as well, and no malfunction shall be observed.	JIS-C-60068-2-31 at no operation
Insulation	Dielectric Strength		1.5kVAC/1minute between input and output *2	Cut-off current 10mA
			1.5kVAC/1minute between input and FG *2	Cut-off current 10mA
			500VAC/1minute between each output/FG	Cut-off current 100mA
	Insulation Resistance		50MΩmin. between input/output/FG	At 500VDC
	Leakage Current		0.20mA typ (100VAC), 0.40mA typ (200VAC) *Characteristic data: Fig.7	
EMC	Line Noise Immunity		±2000V (pulse width of 100/1000nS,cycle period of 30 to 100Hz, Normal/Common mode with Positive/Negative polarity for 10 minutes)	There shall be no fluctuation of DC output or malfunction.
	Electrostatic Discharge		EN61000-4-2 compliant	Apply to FG and case. There shall be no malfunction, nor failure.
	Radiated, Radio-Frequency Electromagnetic Field		EN61000-4-3 compliant	
	Fast Transient Burst		EN61000-4-4 compliant	
	Lightning Surge		EN61000-4-5 compliant	
	Radio Frequency Conducted Immunity		EN61000-4-6 compliant	
	Power-Frequency Magnetic Field Immunity		EN61000-4-8 compliant	
	Voltage dips/Regulation		EN61000-4-11 compliant	
	Conducted Emmision		VCCI-B, FCC-B, CISPR32-B, EN55032-B compliant *Characteristic data: Fig.8, 9	At rated input/output
	Harmonic Current Regulations		IEC61000-3-2 (edition 2.1) classA, EN61000-3-2 (A14) classA compliant	At rated input/output
Others	Safety Standards		UL62368-1, CSA62368-1 (c-UL), UL508 compliant, CE Marking (LVD,EMCD) approved PSE (ordinance clause 2) compliant *3	
	SEMI Standard		SEMI-F47 compliant	Support rated 240W max.
	Cooling System		Convection cooling	
	Output Grounding		Capacitor grounding	
	Output Hold-up Time		20ms typ (A24-*0*), 15ms typ (A24-*B*) *	*Characteristic data: Fig.14 * Without DS01A
	Reliability Grade		FA (Industrial equipment grade to use double-sided PCB with plated through hole)	Following our standard
	Weight		700g typ	With DIN-rail bracket
	Warranty		Three years after delivery: If the defect is our responsibility, the defective unit shall be repaired or replaced at our cost.	Except for operation out of the specification.

*1 When startup is performed at -15°C or lower, it may take several seconds until output voltage becomes stable. Before using this product, evaluate it using an actual machine.
*2 The original dielectric strength between the input and output terminals is 3 kV AC for 1 minute. However, because an arrestor is mounted between the input terminal and frame ground (FG), the actual dielectric strength between them is 1.5 kV AC for 1 minute.
*3 UDP-240-A**-*B* (backup model for momentary power failure) is compliant.

<Fig.1> Low input voltage derating

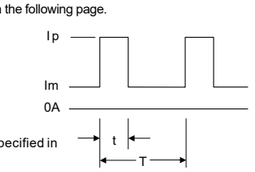
Follow the derating below to derate rated current/power.



Peak output power condition

- Duty ratio of peak current shall be 30% or less.
- Energized period of peak current shall be 10 seconds or less.
- In the case that the ambient temperature is 50°C or higher with convection cooling, the energized period of peak current shall be 5 seconds or less.
- The value resulting from the formula below shall not exceed the continuous rated current, Io, after derating specified in the clause, “Output derating” on the following page.

$\sqrt{((Ip^2 \times D)+(Im^2 \times (1-D)))} \leqq Io$
Ip=Peak current value
Im= Peak current value
D= Duty cycle, t/T
t= Pulse width of peak current
T=Cycle
Io= Continuous rated current specified in output derating.

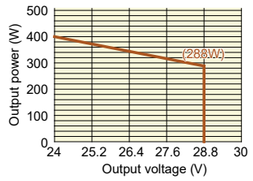


(Note) If the temperature of the power thermistor for limiting inrush current does not rise enough (and its resistance value is too large), such as when the normal average load power is small, the output voltage at peak output might drop about 100 ms. If this might cause any problem, please check the output voltage waveform while the power supply is installed on an actual device at operation.

General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

<Fig.2> Peak output derating

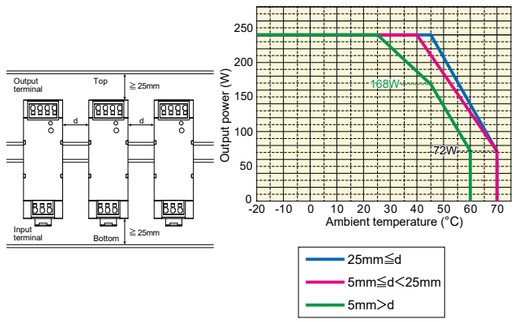
Use this product by reducing the peak power according to the preset output voltage, as shown in the derating diagram shown below.



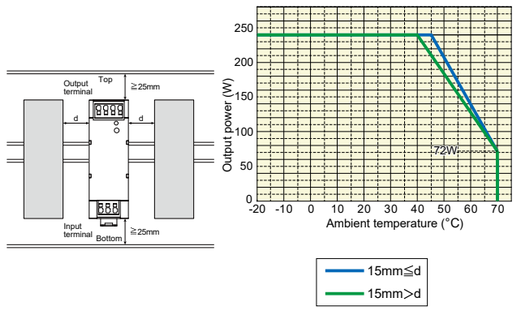
<Fig.3> Installation/Output derating

Follow the derating diagram below for output according to ambient temperature and installation direction.
When installing on a DIN-rail, make sure that there is at least 25 mm space above and below the product. In addition, derate the output according to the distance between two adjacent products as shown in the derating diagram shown below.
The ambient temperature during installation on a DIN-rail means the temperature at the position where convecting air enters the power supply.
* The heat source is assumed to be the power supply of the same model operating at the same power.

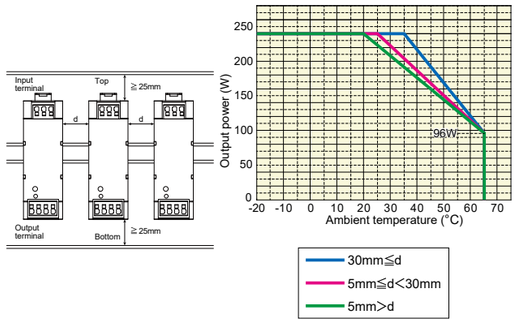
Installation direction A When the adjacent devices are heat sources



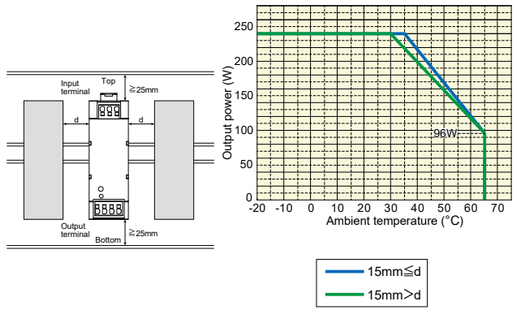
Installation direction A When the adjacent devices are not heat sources



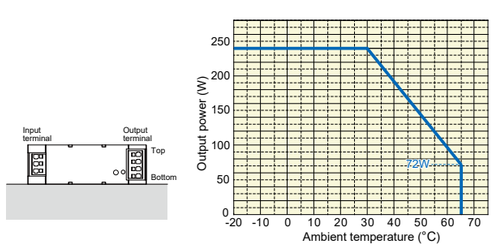
Installation direction B When the adjacent devices are heat sources



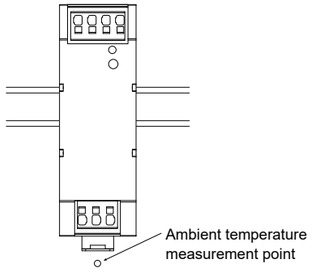
Installation direction B When the adjacent devices are not heat sources



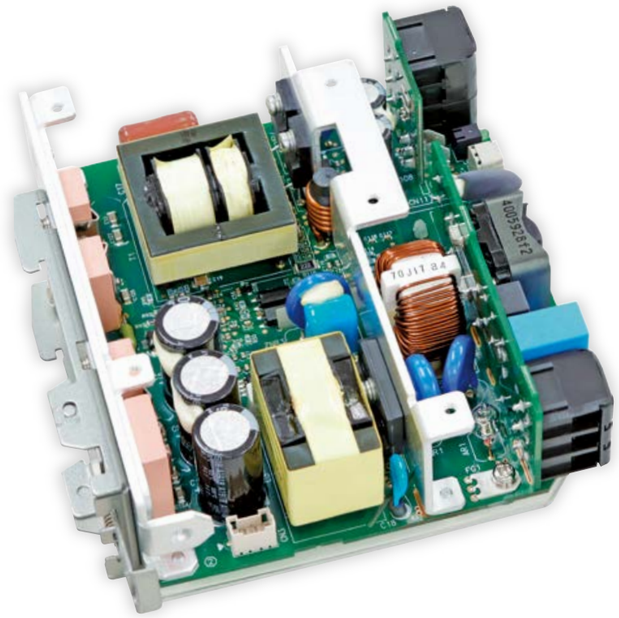
Installation direction C



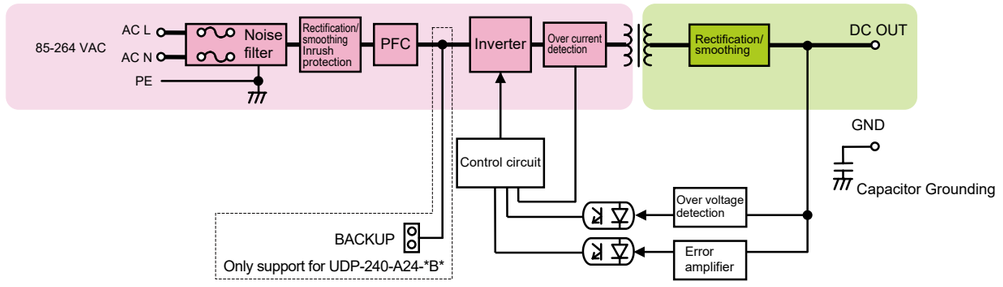
Ambient temperature measurement point



Internal Structure

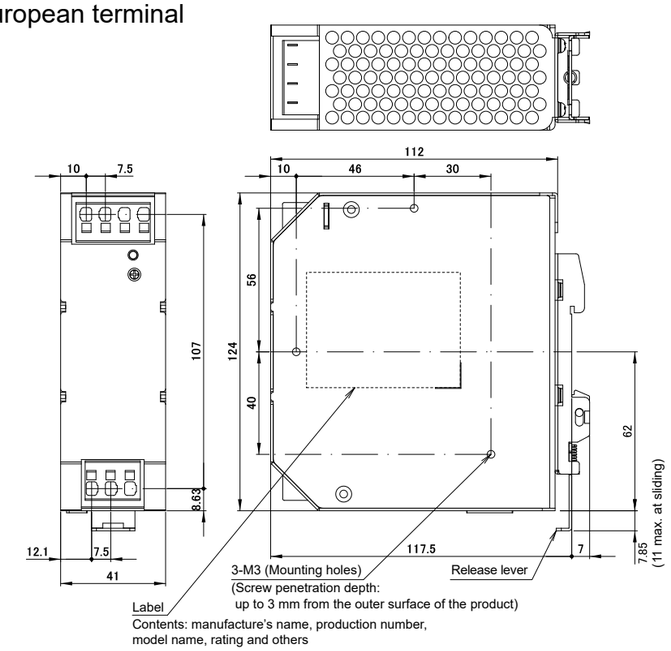


Block Diagram

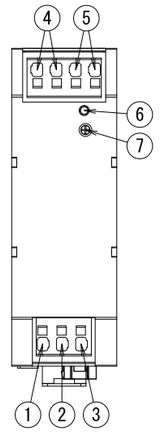


Outline Drawing

European terminal



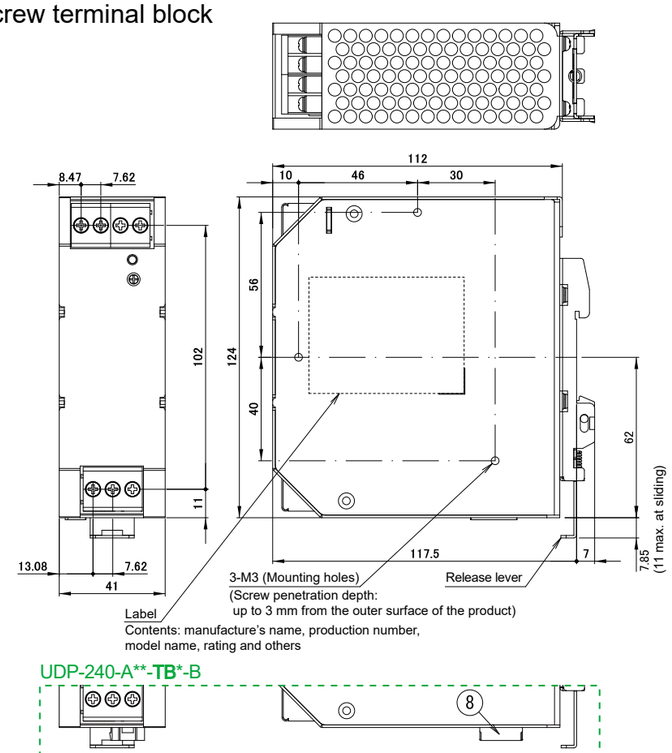
*Connector pin allocation



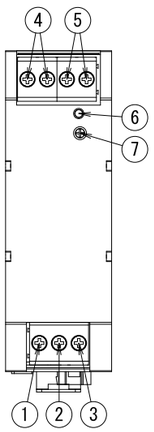
No.	Name	Function
①	AC(L)	Input terminal
②	AC(N)	
③	PE	Protective ground terminal
④	+VOUT	+ Output terminal
⑤	-VOUT	- Output terminal
⑥	PWR_OK	Output voltage confirmation LED
⑦	ADJ	Variable resistor to adjust output voltage
⑧	BACK UP	Backup connector

UDP-240-A**-**EB***-B

Screw terminal block



*Connector pin allocation



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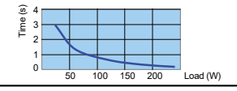
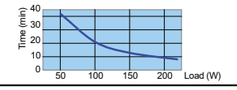
⑥	PWR_OK	Output voltage confirmation LED
⑦	ADJ	Variable resistor to adjust output voltage
⑧	BACK UP	Backup connector

UDP-240-A**-**TB***-B

●Dimensional tolerance: ± 1 (± 0.5 for mounting dimension)

Options (Sold separately)

Capacitor unit / Battery unit

Photos	Model	Category	Size	Backup time*1
	DS01A-EC400/172F-B*2	Capacitor unit	(W×D×H=41×124×117.5mm)	
	DS02A-L24/2.5L-B	Battery unit	(W×D×H=41×124×117.5mm)	

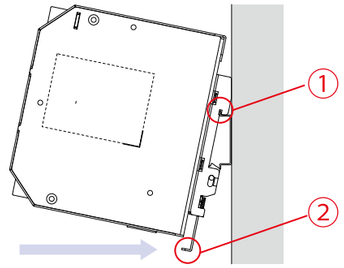
*1 Backup time is a reference value at initial use. It is not a guaranteed value.
*2 DS01A-EC400/172F can only connect to UDP-240-A**-*B* (backup model for momentary power failure).

Cable

Photos	Model	Category	Description
	WH-02SPC02SPC-250	Harness for connecting capacitor unit	Connection harness for connecting the capacitor unit (DS01A-EC400/172F). (Length: 250mm)
	WH-02SPC02SPC-500	Harness for connecting capacitor unit	Connection harness for connecting the capacitor unit (DS01A-EC400/172F). (Length: 500mm)
	WH-02SPC02SPC-250-01	Harness for connecting capacitor unit	Connection harness for connecting the 2 capacitor units (DS01A-EC400/172F).

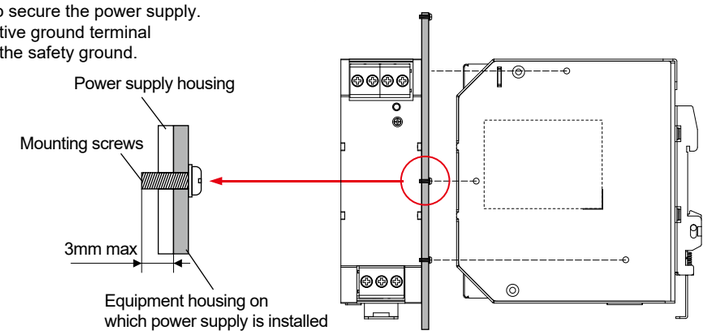
Attach to or Detach from a DIN-Rail

To attach the product to a DIN-rail, hook part 1 (shown below) first and then push the product in the direction indicated by the arrow until it snaps in. To detach the product from a DIN-rail, pull down part 2 first and then remove the product.



Power Supply Mounting Screws and Grounding

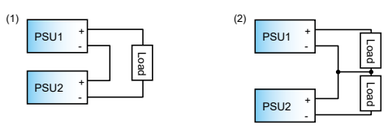
When using the power supply mounting holes, secure the power supply to all the three holes.
Use 3-mm-diameter screws to secure the power supply.
Be sure to connect the protective ground terminal
on the input terminal block to the safety ground.



Connection in Series and Parallel

■ Series operation
Series connection is available as in figure (1) and (2) on the right.

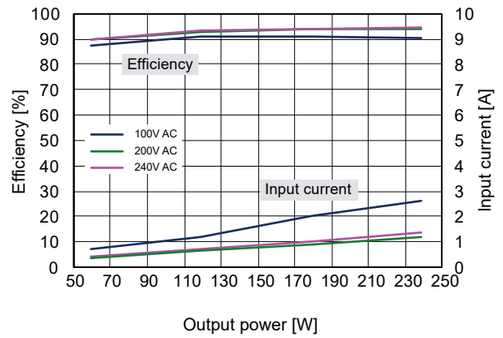
■ Parallel operation
Parallel operation is not possible.



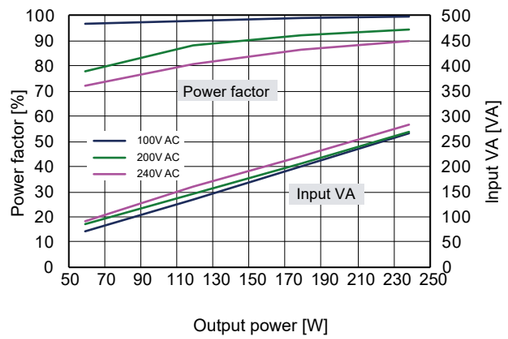
UDP-240 Series

Characteristics Data (Typical features of the product series) UDP-240-A24 (Examples of actual measurement)

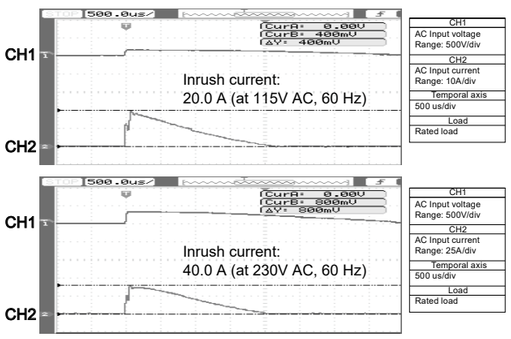
● Fig.4 Efficiency/Input Current vs. Output Power



● Fig.5 Power Factor/Input VA vs. Output Power



● Fig.6 Inrush Current



● Fig.7 Leakage Current

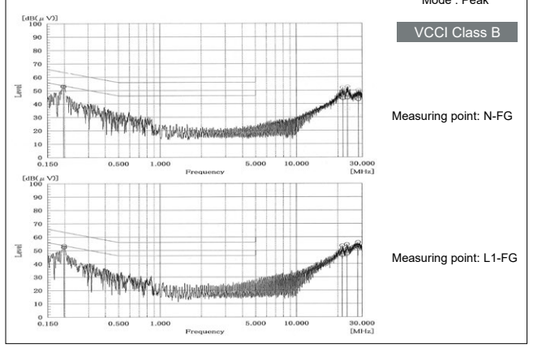
Input : 100, 200V AC
Load : Rated load and Min. load

	Rated load	Min. load
100V AC	0.18mA	0.19mA
200V AC	0.39mA	0.39mA

● Fig.8 Conducted Emission at 100V AC

Input : 100V AC
Load : Rated
Mode : Peak

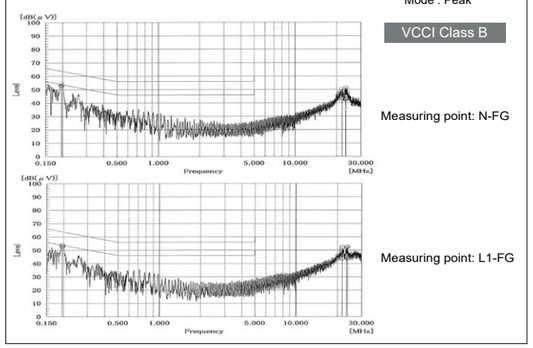
VCCI Class B



● Fig.9 Conducted Emission at 230V AC

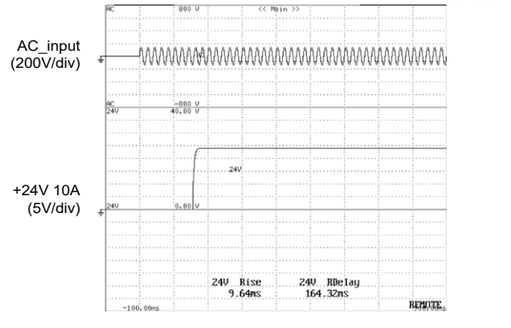
Input : 230V AC
Load : Rated
Mode : Peak

VCCI Class B



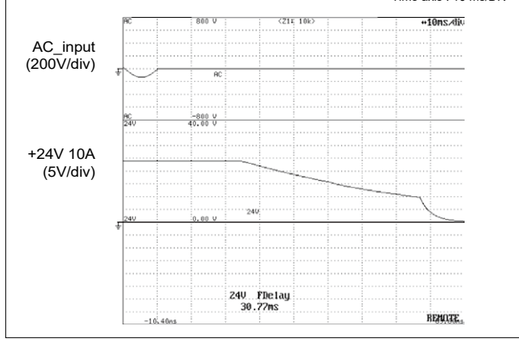
● Fig.10 Rising Characteristics at 100V AC

Input : 100V AC
Load : Rated
Time axis : 100 ms/DIV



● Fig.11 Falling Characteristics at 100V AC

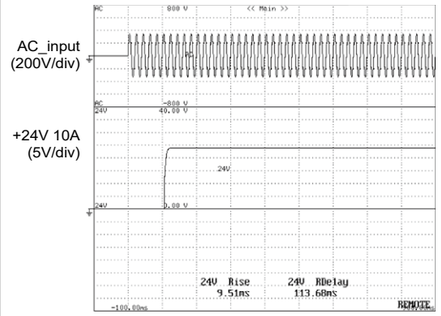
Input : 100V AC
Load : Rated
Time axis : 10 ms/DIV



Characteristics Data (Typical features of the product series) UDP-240-A24 (Examples of actual measurement)

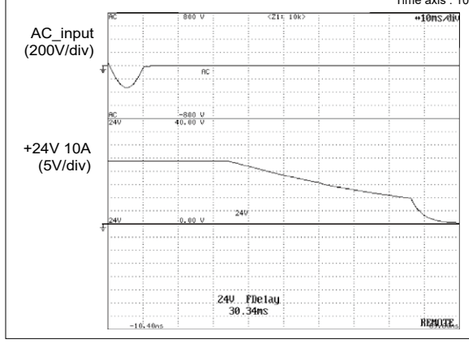
● Fig.12 Rising Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 100 ms/DIV

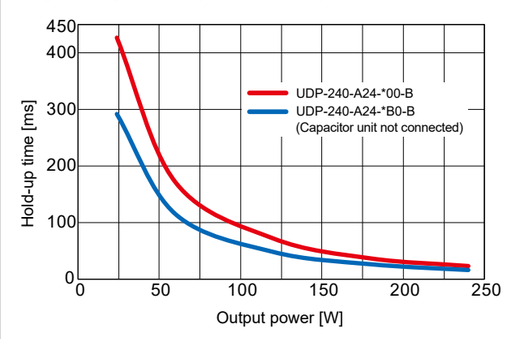


● Fig.13 Falling Characteristics at 240V AC

Input : 240V AC
Load : Rated
Time axis : 10 ms/DIV

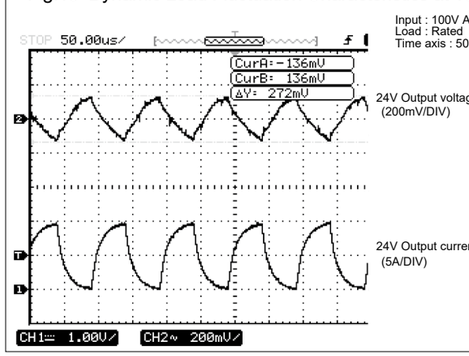


● Fig.14 Output Hold-up Time vs. Output Power

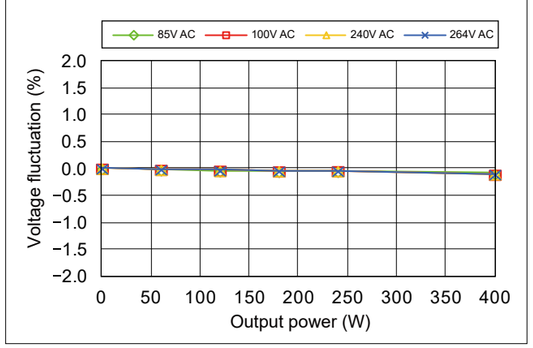


● Fig.15 Dynamic Load Fluctuation Characteristics at 10kHz

Input : 100V AC
Load : Rated
Time axis : 50μs/DIV



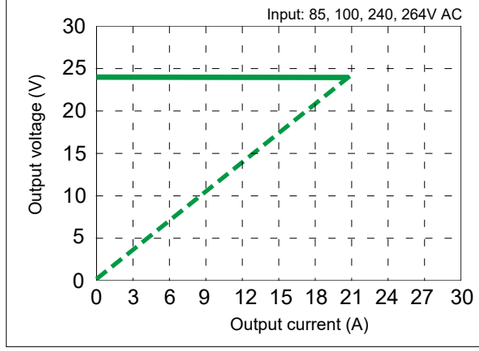
● Fig.16 Output Voltage Regulation (Load Fluctuation)



● Fig.17 Ripple and Spike Voltage

Temperature	AC Input voltage	CH1 24V					
		Minimum load		50% load		Rated load	
		Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)	Ripple(mV)	Noise(mV)
-25℃	85V	5.6	29.2	29.0	49.7	70.9	110.1
	100V	5.4	25.2	28.1	48.4	64.2	100.3
	240V	5.2	22.4	25.5	48.7	49.9	86.5
	264V	5.5	22.0	24.4	42.7	47.4	88.1
25℃	85V	4.3	21.8	8.1	31.0	18.7	53.4
	100V	4.4	22.7	8.1	31.2	19.2	52.5
	240V	4.0	22.4	7.8	30.7	20.3	51.4
	264V	4.0	22.2	7.8	30.9	20.3	52.8
50℃	85V	3.2	14.2	7.2	29.7	19.3	48.4
	100V	3.9	19.4	7.3	29.6	18.7	49.5
	240V	3.8	19.8	7.2	29.9	17.5	47.8
	264V	3.8	18.9	7.2	31.2	17.7	51.7
75℃	85V	1.6	4.7	2.9	4.4	3.8	5.9
	100V	1.6	4.5	2.9	4.6	3.9	6.0
	240V	1.4	3.8	3.0	4.3	3.8	5.7
	264V	1.4	4.1	2.9	4.4	3.8	5.7

●Fig.18 Overcurrent Protection Characteristics (V - I Characteristics)



Capacitor unit DS01A-EC400/172F

Model	Description
DS01A-EC400/172F-B	—

■Model name coding

DS01 A - EC 400 / 172F-B
① ② ③ ④ ⑤ ⑥

① Series name
② Modification
③ Electrolytic capacitor
④ Output voltage
⑤ Capacity
⑥ DIN-rail
Blank:Without DIN-rail bracket
B:With DIN-rail bracket

Compatible Power Supply

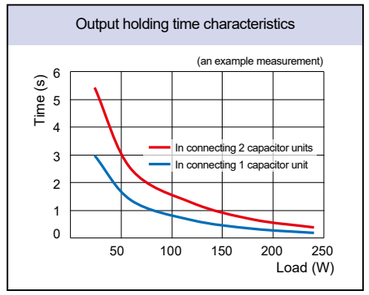
- ●UDP-120-A**-*B*-*
- ●UDP-180-A**-*B*-*
- ●UDP-240-A**-*B*-*

Features

- ●About 15 years expected life (at 40°C)
  Maintenance free (periodic replacement not required)
- ●Low and high operating temperature (-20°C to 70°C)
- ●DIN-rail compatible model

Output holding time characteristics (Measured with UDP-240-A24-EB0 at 100V AC input)

(Please note that the value shown is an initial reference not guaranteed.)

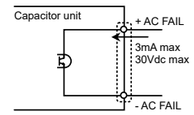


General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

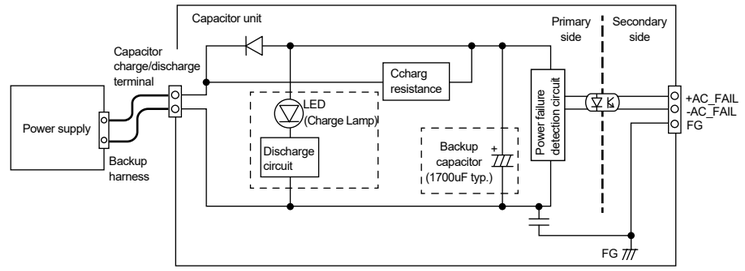
Items	Specification	Measurement condition, etc.
Capacitor	420V 1680uF 105°C	
Operating Temp. / Humidity	-20 to 70°C / 20 to 90% RH	No condensation
Storage Temp. / Humidity	-40°C to 85°C / 10 to 95% RH	No condensation
Weight	560g typ	With DIN-rail bracket
Capacitor Charge Current	0.25A max.	
Capacitor Charge Time	Max. 15 s	Charging time to 90% after the power supply is turned on.
Self-discharge Time	Max. 15 min	Time until the capacitor voltage decreases to 60V in the case that the connection with the power supply goes open at full charge.
Vibration	2G, 10-55Hz, 10 sweep cycles in each X, Y, Z direction	Follow JIS-C-60068-2-6 at no operation
Mechanical Shock	Lift one bottom edge 50mm high with the opposite edge placed on a test bench, and let it fall. Repeat 3 times on the other three edges as well, and no malfunction shall be observed.	Follow JIS-C-60068-2-31 at no operation
Insulation Resistance	50MΩ or more between each capacitor charge/discharge terminal, AC_FAIL and FG	At 500VDC
Dielectric Strength	3kVAC/1minute between capacitor charge/discharge terminal and AC_FAIL	Cut-off current 10mA
	2kVAC/1minute between capacitor charge/discharge terminal and FG	Cut-off current 10mA
	500VAC/1minute between AC_FAIL and FG	Cut-off current 10mA
Reliability Grade	FA (Industrial equipment grade to use double-sided PCB with plated through hole)	Original design category
Life Expectancy*	About 15 years	Environmental temperature: 40°C Based on the calculation of the actual life of an electrolytic capacitor.
Warranty	Three years after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost.	Except for errors caused by operation not specified in this specification.

*Life expectancy is a reference value. It is not a guaranteed value.

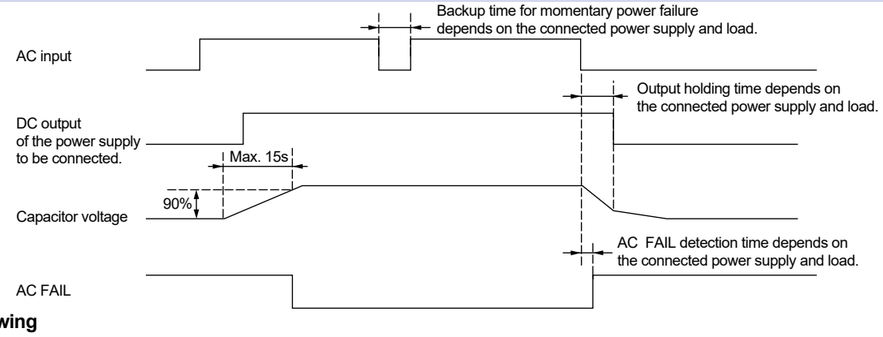
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification	Signal Circuit
Output Signal	Power failure detection circuit (AC FAIL)	'OPEN' is delivered at low AC input voltage or power failure. It detects a decrease in voltage of the backup capacitor inside the capacitor unit. The short and long of the detection times depend on the size of the output power.	
	Charge Lamp	The light gradually dims in the range where the voltage of the backup capacitor is 20V or less.	

Block Diagram

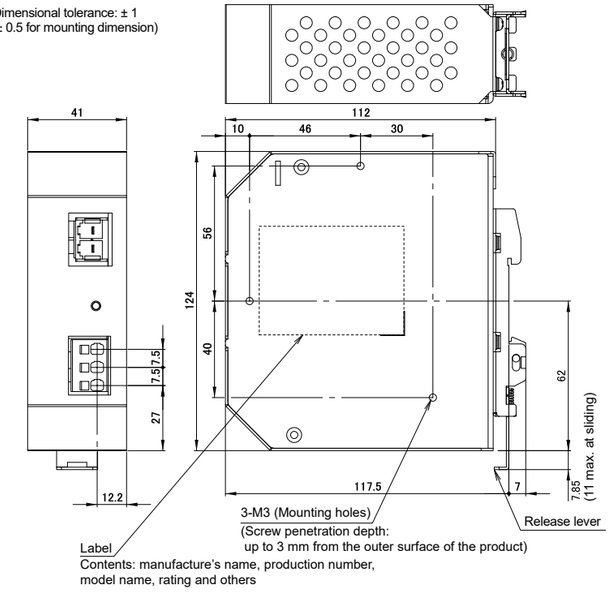


Sequence Timing Chart

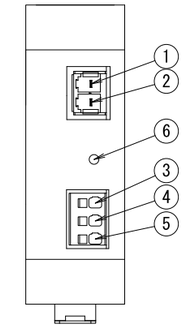


Outline Drawing

●Dimensional tolerance: ± 1
(± 0.5 for mounting dimension)



*Connector pin allocation



No.	Name	Function
①	-CAPACITOR	- capacitor charge/discharge terminal
②	+CAPACITOR	+ capacitor charge/discharge terminal
③	+AC_FAIL	+ AC Fail signal output terminal
④	-AC_FAIL	- AC Fail signal output terminal
⑤	PE	Protective earth (PE) terminal
⑥	CHARGE LED	CHARGE LED (Green)

Backup Unit DS02A-L24/2.5L

Model	Description
DS02A-L24 / 2.5L-B	—

■Model name coding

DS02 A - L24 / 2.5L - B

① ② ③④ ⑤ ⑥

① Series name
② Modification
③ Lithium-ion battery
④ Output voltage
⑤ Capacity
⑥ DIN-rail
Blank:Without DIN-rail bracket
B:With DIN-rail bracket

Compatible Power Supply

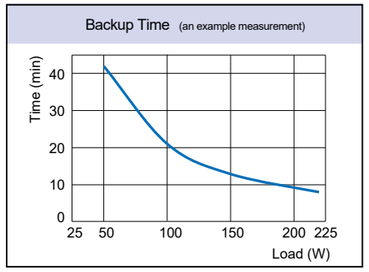
- ●UDP-120-A24-***-*
- ●UDP-180-A24-***-*
- ●UDP-240-A24-***-*

Features

- ●Lithium-ion battery is adopted.
- ●DIN-rail compatible model

Backup Time (Measured with UDP-240-A24-E00)

(Please note that the value shown is an initial reference not guaranteed.)



General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

Items	Specification	Measurement condition, etc.
Battery	Lithium-ion battery	
Nominal Battery Power Voltage	18VDC (3.6V 5 series)	
Rated Capacity	2500mAh	Factory setting capacity is less than 30%
Backup Output Voltage	23V -5%, +2%	
Backup Output Current	Continuous 9.2A	
DC Input	23.8-28V	The output voltage of the UDP shall be within the range on the left.
Charge Voltage	20.5V typ	
Charge Current	0.5A typ	At 18V battery voltage
Backup Time	7min or more (At load current 9.2A)	Typical value after full charge at the temperature of using a fresh battery and 25°C. If the voltage (capacity) decreases due to self-discharge, the discharge time becomes shorter.
Discharge Cut-off Voltage	15V typ	The battery voltage monitoring circuit forcibly stops the battery discharge to prevent over-discharge of the battery.
Operating Temp. / Humidity	10 to 45°C•10 to 90%	No condensation
Storage Temp. / Humidity	Storage within 1 year: -20 to +20 °C / humidity 10-95% Storage within 90 days: -20 to +40 °C / humidity 10-95% Storage within 30 days: -20 to +50 °C / humidity 10-95%	No condensation *1
Vibration	Displacement amplitude: 0.075mm (10-55Hz), Sweep cycles: 10, Test duration: 45 min in each X, Y, Z direction	Follow JIS-C-60068-2-6 at no operation
Mechanical Shock	Lift one bottom edge 50mm high with the opposite edge placed on a test bench, and let it fall. Repeat 3 times on the other three edges as well, and no malfunction shall be observed.	Follow JIS-C-60068-2-31 at no operation
Weight	750g typ.	
Reliability Grade	FA	Original design category
Warranty	One year after delivery: If any defects belong to us, the defective unit shall be repaired or replaced at our cost. Except for internal battery.	Except for errors caused by operation not specified in this specification.

*1 Recharging once at least per year (or 6 months if available) is required for 6 months or longer storage. When recharging is not conducted beyond the period, the battery may not recover its capacity completely. Approximately 4 hours of charging time may be required in such a case.

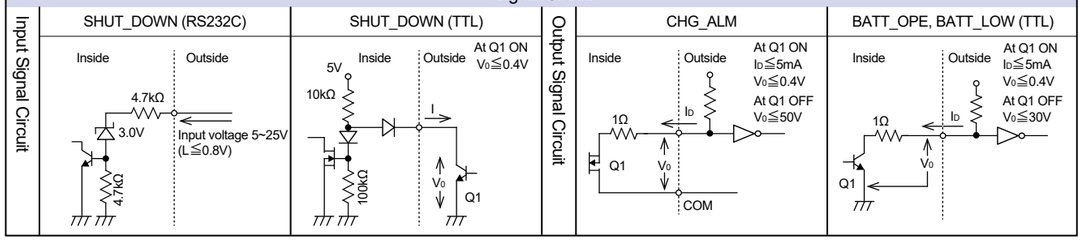
*2 When a backup unit is connected to the power supply, about 20W of power is consumed due to the charging operation of the backup unit, etc. Please reduce the output load of the power supply when the backup unit is connected.

*3 When using the product in a high temperature environment, the charging temperature protection will be activated and charging will be temporarily stopped, which may result in a longer charging time. Also, please note that charging will stop at low-temperature environment.

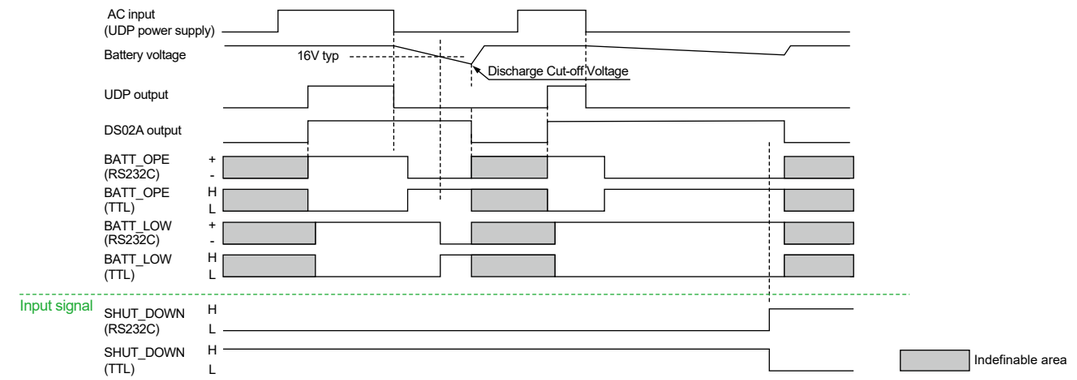
General Specification (Items are provided at normal temperature and humidity unless otherwise specified.)

	Items	Specification	Note
Input Signal	Backup stop signal for RS232C (SHUT_DOWN)	The backup operation is stopped when 'Positive voltage (5-25V)' is input during backup operation. * Negative voltage is acceptable up to -11V.	
	Backup stop signal for TTL (SHUT_DOWN)	The backup operation is stopped when 'L' is input during backup operation.	
Output Signal	Charging notification signal (CHG_ALM)	'L' signal is delivered when charging a battery.	
	Backup operation signal for RS232C (BATT_OPE)	'Negative voltage' is delivered when operating backup. Using equivalent to ADM232AARN (Analog Devices)	
	Backup operation signal for TTL (BATT_OPE)	'H' is delivered when operating backup.	
	Low battery voltage signal for RS232C (BATT_LOW)	'Negative voltage' is delivered when battery input terminal voltage falls down to 16V typical. Using equivalent to ADM232AARN (Analog Devices)	
	Low battery voltage signal for TTL (BATT_LOW)	'H' is delivered when battery input terminal voltage falls down to 16V typical.	

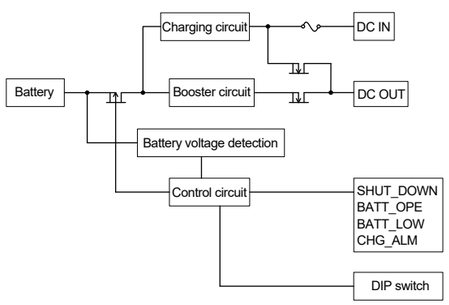
Signal Circuit



Sequence Timing Chart



Block Diagram



Outline Drawing

●Dimensional tolerance: ± 1
(± 0.5 for mounting dimension)
DIP switch setting

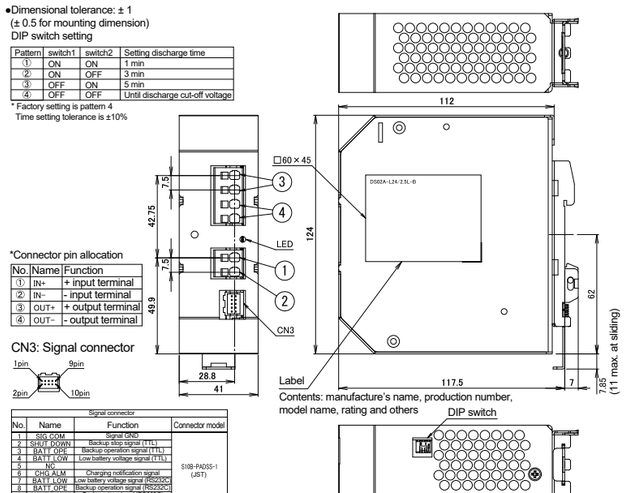
Pattern	switch1	switch2	Setting discharge time
①	ON	ON	1 min
②	ON	OFF	3 min
③	OFF	ON	5 min
④	OFF	OFF	Until discharge cut-off voltage

* Factory setting is pattern 4
Time setting tolerance is ±10%

*Connector pin allocation

No.	Name	Function
①	IN+	+ input terminal
②	IN-	- input terminal
③	OUT+	+ output terminal
④	OUT-	- output terminal

CN3: Signal connector



Signal connector			
No.	Name	Function	Connector model
1	SIG.COM	Signal GND	S10B-PADSS-1 (JST)
2	SHUT_DOWN	Backup stop signal (TTL)	
3	BATT_OPE	Backup operation signal (TTL)	
4	BATT_LOW	Low battery voltage signal (TTL)	
5	NC		
6	CHG.ALM	Charging notification signal	
7	BATT_LOW	Low battery voltage signal (RS232C)	
8	BATT_OPE	Backup operation signal (RS232C)	
9	SHUT_DOWN	Backup stop signal (RS232C)	
10	SIG.COM	Signal GND	

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