Rack Mount Power Supply vNSP-300P-X4S

Model	Description	Stock
vNSP-300P-X4S	——	Contact us

■Model Name Coding

vNSP - 300 P - X 4 S
① ② ③ ④ ⑤ ⑥

1. Series name
2. Output power
3. Peak output compliant
4. ATX output
5. DC input voltage (battery voltage) 48V type
6. Standard

Features

- With redundant operation and backup function with DC input, this unit enables no power failure and completely uninterruptible operation.
- Both simultaneous input of AC+DC and single input of AC or DC are available.
- Capacity can be maximized by connecting multiple units in parallel. The unit has a complete load balance, and it is hotswappable.
- 6U/10HP size

Since DC input terminals are isolated, one external battery (lead) can operate multiple units (long-term continuous operation is possible)

Refer to “Product Page Guideline” on p.13

Safety standard / Approval	UL	CSA	EN	CE	CCC
Reliability Grade	HFA	FA	HOA	OA	

Function

DC start | RS 232C | USB | TTL | PFC | Silence | 5VSB FAN | TSFC FAN | Connection | RoHS

Input

AC input	85 - 264V (worldwide range)
DC input	40 - 65V *Battery package can be connected, DC startup available
*Battery package is optional (sold separately)	
*For safety standard, input range shall be 90 - 264 VAC or 40 - 59 VDC	

Output

Output voltage	*+3.3V*	*+5V*	*+12V*	*-12V*	*+5VSB*
Max. current/ max. power (continuous)	15A	35A	5A	4A	0.5A
	Total 39A				
	Total 250.7W				
Peak current/ peak power (5 sec max.)	17A	40A	7A	5A	0.5A
	Total 40A				
	Total 300W				
Min. current	0A	2A	0A	0A	0A
*Peak current shall be at rated input voltage (100 - 240V)					

Dimensions

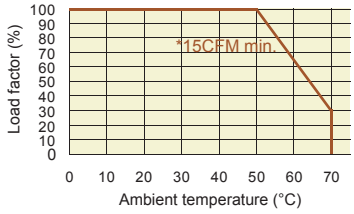
W×H×D (mm)	50.4×261.9×162.5

General Specification Condition: at normal temperature and humidity unless otherwise specified

	Items		Specification					Measurement conditions, etc.
AC Input	Rated Voltage		100 - 240 VAC (85* - 264 VAC)					Worldwide range *90 VAC min. for safety standard
	Input Frequency		50 / 60Hz					47 - 63Hz
	Efficiency		67% typ. (100 VAC), 69% typ. (240 VAC) *Characteristic data: Fig.2					At rated input/output
	Power Factor		99% typ. (100 VAC), 94% typ. (240 VAC) *Characteristic data: Fig.3					
	Inrush Current		35A max. peak *Characteristic data: Fig.4					At rated input/output at cold start (25°C)
	Input VA		390VA max. *Characteristic data: Fig.3					At rated input/output and max. output
			530VA max.					At input 85V and max. output
DC Input	Rated Voltage		48 VDC (40 - 65 VDC*)					DC startup available *59 VDC min. for safety standard
	Battery Discharge Cut-off Voltage		34±1V max. (shutdown of battery circuit)					
	Efficiency (at Battery Operation)		70% typ.					At rated input/output
Output	Rated Voltage		+3.3V	+5V	+12V	-12V	+5VSB	
	Rated Current		4A	35A	3A	2A	0.5A	
	Max. Current / Power		15A	35A	5A	4A	0.5A	Max. output power: 250.7W
			39A max.					
			250.7W max.					
	Peak Current / Power		17A	40A	7A	5A	0.5A	Peak output power: 300W Time: 10 sec or less Peak output shall be at 100-240V rated input voltage
			40A max.					
			300W max.					
	Min. Current		0A	2A	0A	0A	0A	
	Total Voltage Accuracy (%)		+5 / -2.5 max.	+5 / -2.5 max.	±5 max.	±5 max.	±5 max.	Total accuracy of temperature, input, load, and cross fluctuations, and drift.
	Max. Ripple Voltage (mVp-p)		50 max.	50 max.	100 max.	100 max.	50 max.	Two wires are coming out from the output connector and connected into one. 47µF electrolytic capacitor is placed on it and it is measured at 0 - 15MHz range. *Characteristic data: Fig.15
	Max. Spike Voltage (mVp-p)		100 max.	100 max.	200 max.	200 max.	100 max.	
Protection	Overcurrent Protection	OCP Point (A)	7 min.	38 min.	105% min. of peak current			All other outputs are at rated input/output
			42 min.					
		Method	All outputs except for +5VSB shutdown				All outputs shutdown	
	Recovery (Overcurrent)	At AC Operation	Reclosing AC input				Automatic recovery	
		At Battery Operation	Reclosing input					
	Overvoltage Protection	OVP Point (V)	4.3 - 4.8	6.0 - 7.0	-	-	-	
		Method	All outputs except for +5VSB shutdown		-	-	-	
	Recovery (Overvoltage)	At AC Operation	Reclosing AC input		-	-	-	
		At Battery Operation	Reclosing input		-	-	-	
	Current Balance Circuit		Equipped				None	Up to 3 units can be connected in parallel
Charge	Charge Voltage		54.6V typ. (at 25°C with fully-charged battery)					
	Charge Current		0.2±0.1A (at 48V battery voltage)					
Environment	Operating Temp. / Humidity		0 to 70°C* / 30 to 80%					*Refer to Fig.1 No condensation
	Storage Temp. / Humidity		-40 to 85°C / 10 to 95%					No condensation
	Vibration	At Standby	Displacement amplitude: 0.15mm (10-55Hz), Sweep cycles: 10, Test duration: 45 minutes each axis					IEC-60068-2-6-1995
		At Operation	Displacement amplitude: 0.035mm (10-55Hz), Sweep cycles: 10, Test duration: 45 minutes each axis					
	Mechanical Shock	At Standby	Acceleration of 196m/s^2 for 6ms one time each in the X, Y and Z directions. No malfunction, damage, loosening or coming-off					IEC-60068-2-27-1972
		At Operation	Acceleration of 30m/s^2 for 11ms one time each in the X, Y and Z directions. No malfunction, damage, loosening or coming-off					
Insulation	Dielectric Strength		AC input - DC output/FG/DC input: 2285 VAC for 1 minute					
	Insulation Resistance		AC input - DC output/FG/DC input: 50MΩ min.					At 500 VDC
			DC input - DC output - FG: 50MΩ min.					
	Leakage Current		1mA max. (240 VAC) *Characteristic data: Fig.5					YEW. TYPE3226 (1kΩ) or equivalent
EMC	Line Noise Immunity		±2000V (pulse width: 100/800ns, repetitive cycle: 10-50ms)					It shall follow the DC output specification No malfunction
	Electrostatic Discharge		EN61000-4-2 compliant					
	Radiated, Radio-Frequency EM Field		EN61000-4-3 compliant					
	Fast Transient Burst		EN61000-4-4 compliant					
	Lightning Surge		EN61000-4-5 compliant					
	RF Conducted Immunity		EN61000-4-6 compliant					
	Magnetic Field Immunity		EN61000-4-8 compliant					
	Voltage Dip / Regulation		EN61000-4-11 compliant					
	Conducted Emission		EN55022 Class A compliant					Measured by single unit
	Harmonic Current Regulation		IEC1000-3-2 Class A, EN61000-3-2 Class A compliant *Characteristic data: Fig.6 and 7					At rated input/output
Others	Safety Standard		UL60950, CSA C22.2 No.60950					
	Cooling System		Forced air cooling: external fan					
	Output Grounding		Capacitor grounding					
	Output Hold-up Time		SYS RESET holds up 22ms min. after AC failure (at AC input) / 0ms min. (at DC input only) *Characteristic data: Fig.12					At rated output
	Reliability Grade		FA (industrial equipment grade, double-sided through hole PCB)					Follow our standard
	MTBF		82,000H min.					Based on EIAJ RCR-9102
	Weight		3.0kg max.					
	Warranty		3 years after delivery. If any faults belong to us, the defective unit shall be repaired or replaced at our cost.					Except for errors caused by operation not listed

Fig.1 Temperature Derating

When the ambient temperature (near the airflow inlet) exceeds 50°C, follow the derating curve to derate rated current/power, max. current/power, and peak current/power.



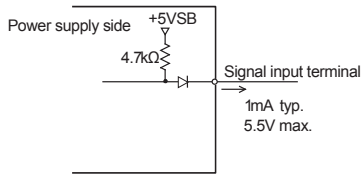
Signal Input / Output Specification Condition: at normal temperature and humidity unless otherwise specified

	Items	Specification	Note
Input Signal	Current balance CB (+3.3V)	When connecting multiple (three units max.) power supplies in parallel, connecting this signal terminal between the power supplies equally distributes load current to each power supply.	The pin 6 of P3 connector (a)
	Current balance CB (+5V)		The pin 6 of P3 connector (c)
	Current balance CB (+12V)		The pin 12 of P3 connector (a)
	Current balance CB (-12V)		The pin 10 of P3 connector (c)
	Voltage balance VB (+3.3V)	When connecting multiple (three units max.) power supplies in parallel, connecting this signal terminal between the power supplies enables to adjust the output voltage of other units in parallel connection while controlling the variable resistor of one unit. If this is the case, turn the voltage control of the other units fully to the left.	The pin 8 of P3 connector (c)
	Voltage balance VB (+5V)		The pin 8 of P3 connector (a)
	Voltage balance VB (+12V)		The pin 10 of P3 connector (a)
	Voltage balance VB (-12V)		The pin 14 of P3 connector (c)
	Sensing (SENSE)	By connecting the SENSE terminal to the output load terminal, it compensates the voltage drop of load terminal (+3.3V,+5V,+12V only). SENSE+ and SENSE- wires shall be twisted (or other processing) 50cm max. The voltage drop to be compensated shall be 0.5V max. For +12V, connect SENSE+ only.	+3.3V+SENSE: The pin 16 of P3 connector (c) +3.3V-SENSE: The pin 12 of P3 connector (c) +5V+SENSE: The pin 14 of P1 connector +5V-SENSE: The pin 32 of P1 connector +12V+SENSE: The pin 22 of P3 connector (a)
	Output ON/OFF control (REMOTE ON)	At AC operation, all outputs shutdown with 'L' input and recover with 'H (OPEN)' At DC operation, all outputs shutdown with 'L' input and recover with DC input after switching to 'H (OPEN).'	The pin 14 of P2 connector
	Battery shutdown (SHUT DOWN)	At 'L' input, DC input or battery connection is shutdown (only available at DC operation or battery operation).	The pin 4 of P3 connector (c)
	Charge stop signal (CHARGE STOP)	At 'L' input, charge output is shutdown. When a battery is connected to DC input, do not conduct 'L' input as the battery may over discharge.	The pin 14 of P3 connector (a)
Output Signal	SYS RESET	When +5V is normal (detection delay time: 200ms - 350ms), the signal becomes 'OPEN' (open collector output). When the input fails with AC input only, this signal is delivered 2ms min. after AC FAIL is delivered.	The pin 6 of P2 connector
	Abnormal temperature detection signal (OVER HEAT)	When the temperature inside the power supply becomes abnormal (high temp.), the signal becomes 'OPEN' (open collector output).	The pin 22 of P3 connector (c)
	Blackout detection signal (AC FAIL)	'L' is delivered at low AC input voltage and blackout detection (open collector output) (detection voltage: 80 VAC typ. ,detection delay time: 20ms min. after AC failure). When the input fails with AC input only, the signal is delivered 10ms min. before the output decreases to 4.875V	The pin 4 of P2 connector
	Low battery voltage signal (BATT LOW)	When DC input or battery terminal voltage decreases to 39.3±0.5V, the signal goes 'OPEN' (open collector output). However, if charge stop signal is 'OPEN' while DC input or battery is not connected, BATT LOW signal does not become 'OPEN.'	The pin 4 of P3 connector (a)

Signal Circuit

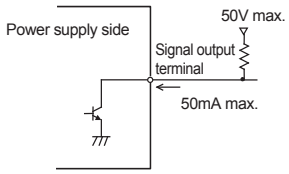
Input Signal Circuit

(REMOTE ON), (SHUT DOWN), (CHARGE STOP)

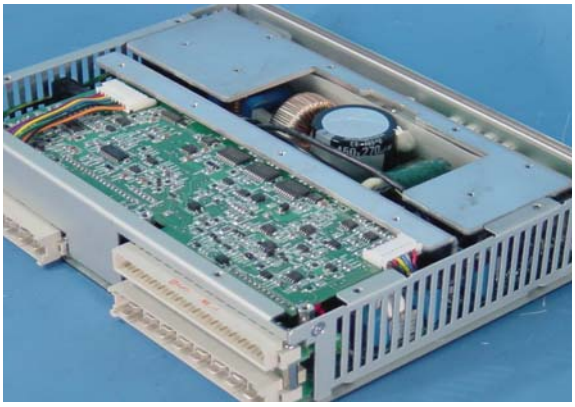


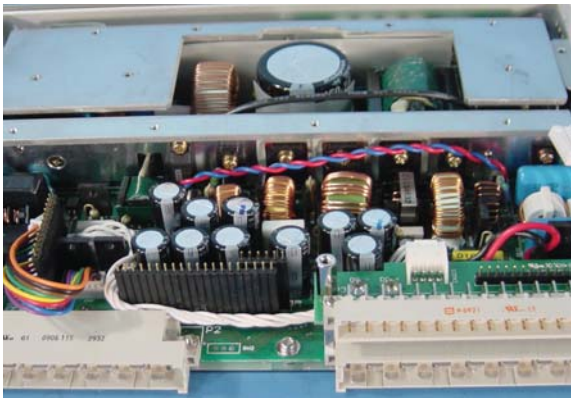
Output Signal Circuit

(SYS RESET), (AC FAIL), (BATT LOW), (OVER HEAT)

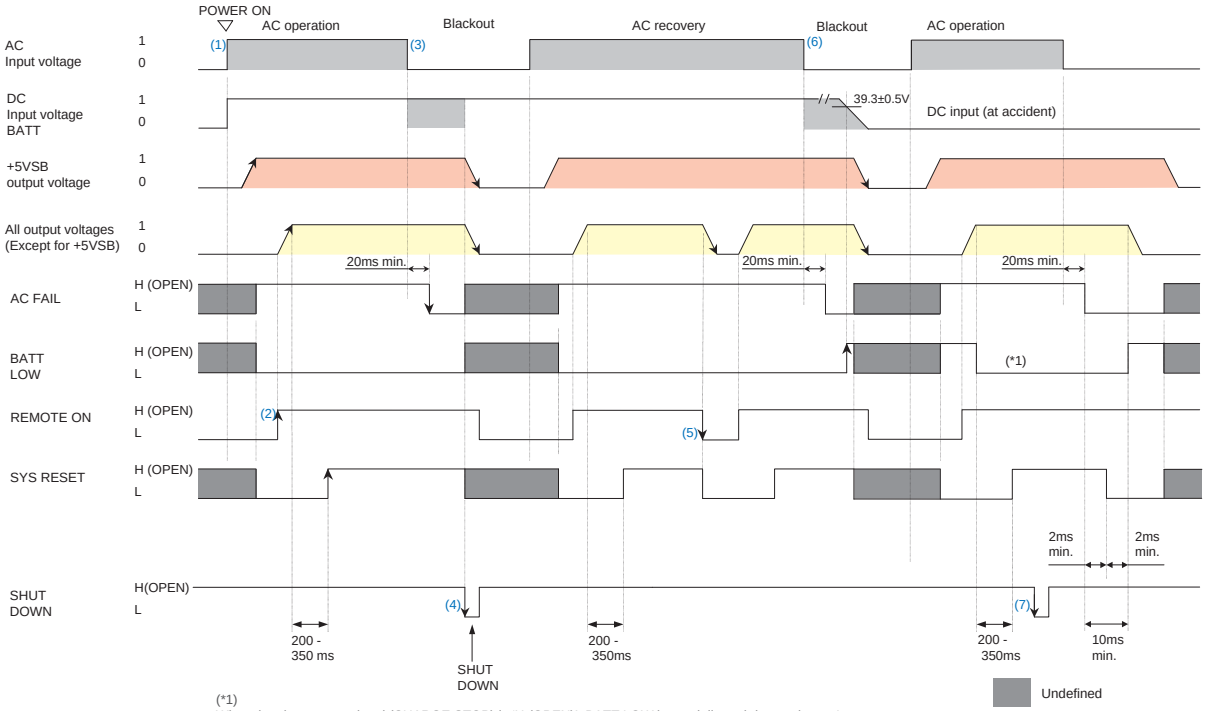


Internal Structure





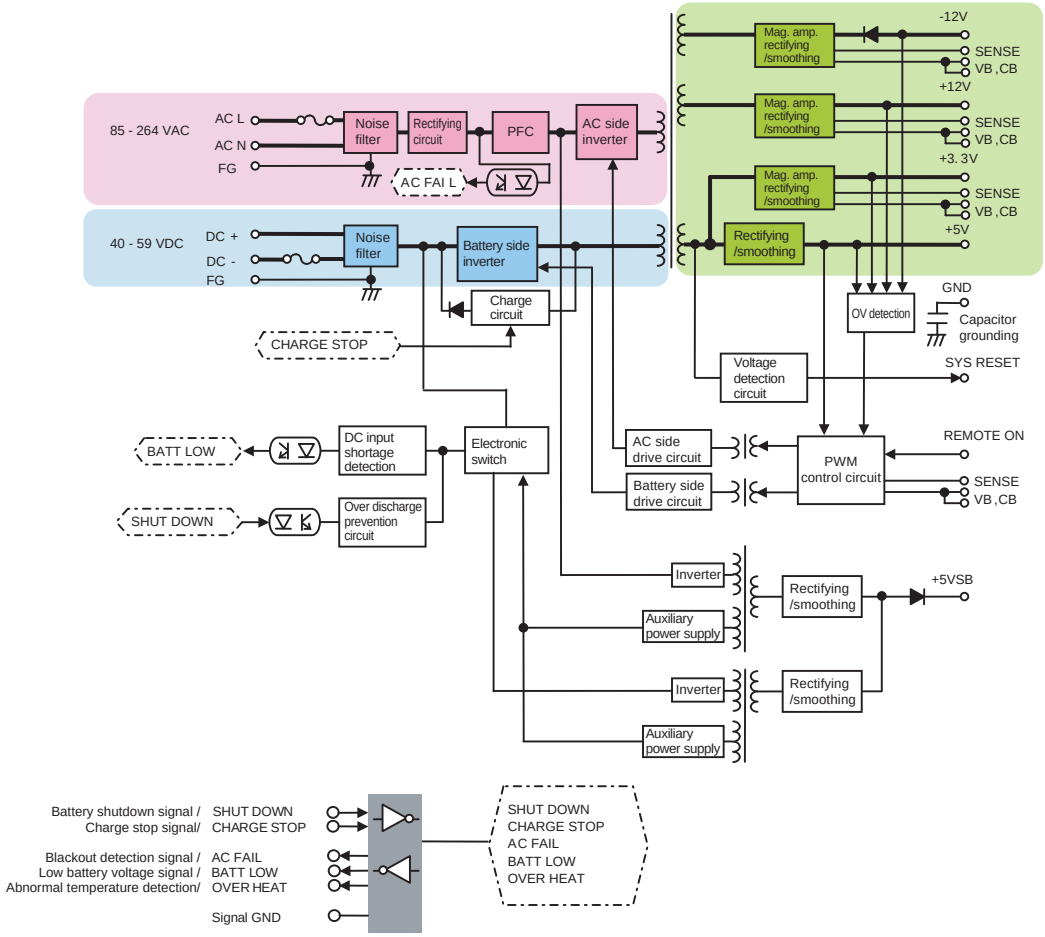
Sequence Diagram



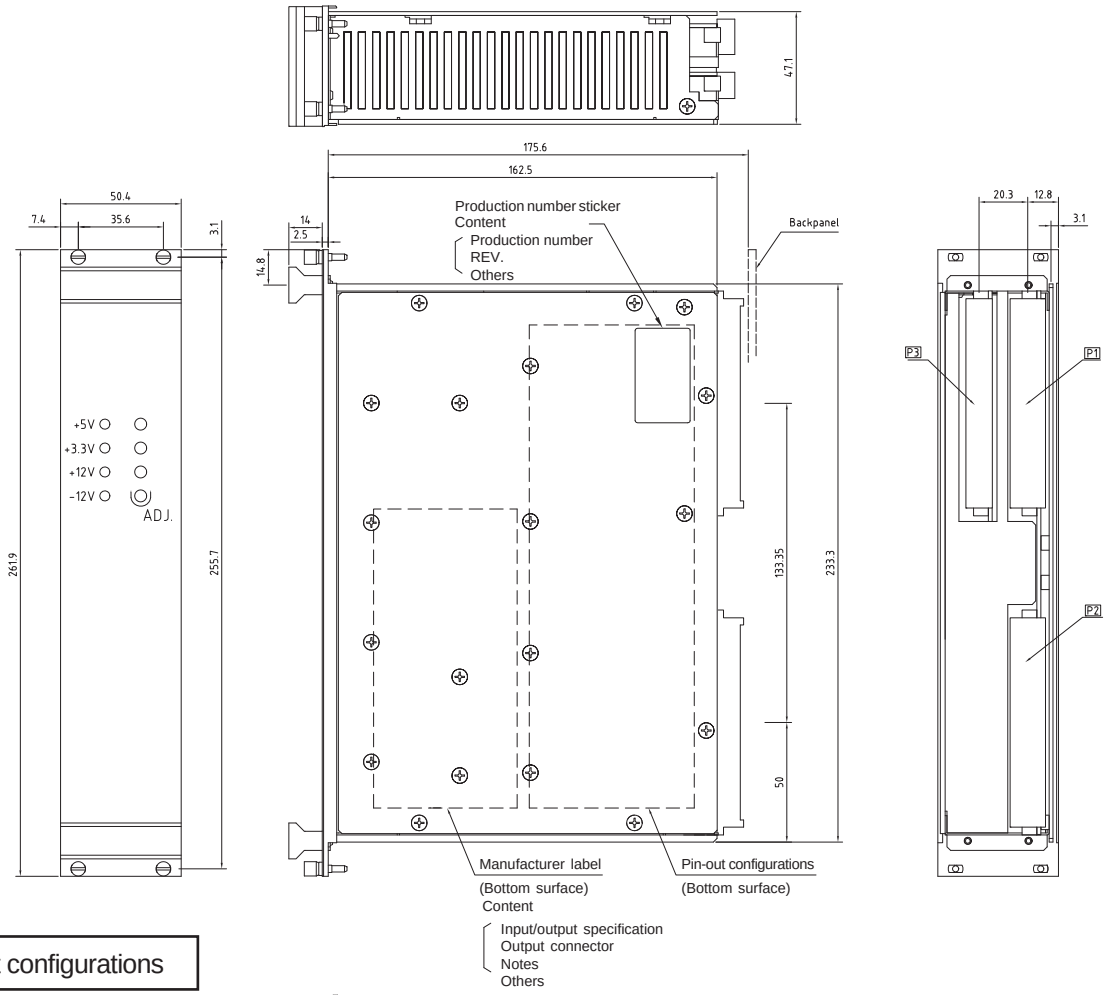
(*1)
When the charge stop signal (CHARGE STOP) is 'H (OPEN)', BATT LOW is not delivered due to charger's output.

(1) With AC input, only +5VSB starts up.
(2) With REMOTE ON 'H (OPEN)' input, all outputs start up. After 200 - 350ms, SYS RESET 'H (OPEN)' is delivered.
(3) AC FAIL 'L' is delivered min. 20ms after blackout.
(4) At blackout, all outputs including 5VSB shutdown with SHUT DOWN input.
(5) When all outputs, including 5VSB start up at AC input, all outputs except for 5VSB shutdown with REMOTE ON 'L' input.
(6) When the battery voltage decreases to 39.3±0.5V or less at backup operation, BATT LOW 'H(OPEN)' is delivered. After it decreases to 34±1V or less, all outputs, including 5VSB shutdown.
(7) At AC input, the output does not change with SHUT DOWN input.

Block Diagram



Outline Drawing



Pin-out configurations

69001-865(Schroff)CN

□=15A / terminal

P1

Content	Signal
Output+5V	+5V
Output+5V	+5V
+5V +Sense	+5V Se
Output GND	COM
OutputGND	COM
Output GND	COM
Output +12V	+12V

Signal	Content
+5V	Output+5V
+5V	Output+5V
+5V	Output+5V
-12V	Output-12V
COM	OutputGND
COM	Output GND
+12V	Output+12V
COM -Sen (-5V)	+5V -Sense

P2

Content	Signal
SysReset	SR
Not used	NC
Remote ON	RC
Output +3.3V	+3.3V
OutputGND	COM
Not used	NC
AC input	AC-N

Signal	Content
AF	AC Fail
SG-COM	Signal GND
NC	Not used
+3.3V	Output+3.3V
COM	Output GND
NC	Not used
AC-L	AC input
FG	FG

□=6A / terminal

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P3

c Signal	c Content
SD	Shut Down
+5V CB	Parallel control CB
+3.3V VB	Parallel control VB
-12V CB	Parallel control CB
COM -Sen (+3.3V)	+3.3V -Sense
-12V VB	Parallel control VB
+3.3V Sen	+3.3V +Sense
SG-COM	Signal GND
+5V (SB)	+5VS
OH	Over Heat
Batt+	Batt+IN
Batt+	Batt+IN
Batt-	Batt-IN
Batt-	Batt-IN

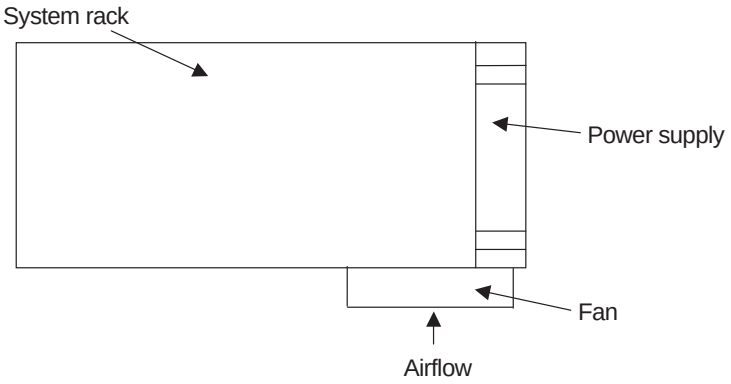
a Content	a Signal
Batt Low	BL
Parallel control CB	+3.3V CB
Parallel control VB	+5V VB
Parallel control VB	+12V VB
Parallel control CB	+12V CB
Charge Stop	CS
+12V +Sense	+12V Se
Batt+IN	Batt+
Batt+IN	Batt+
Batt-IN	Batt-
Batt-IN	Batt-

Names and descriptions of control signal

(i)	RC Remote ON	With 'H' input, power supply turns on.
(i)	SD Shut Down	With 'L' input, battery operation stops.
(i)	CS Charge Stop	With 'L' input, battery charge stops.
(o)	SR Sys Reset	'L' is delivered for 200ms at startup until the output becomes stable.
(o)	BL Batt Low	'L' is delivered when the battery voltage is low.
(o)	AF AC Fail	'L' is delivered when the AC input is OFF(blackout).
(o)	OH Over Heat	'H' is delivered the temperature inside the power supply increases abnormally.

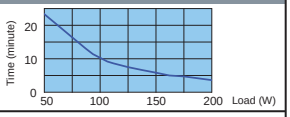
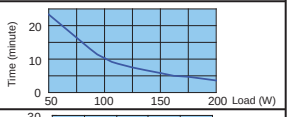
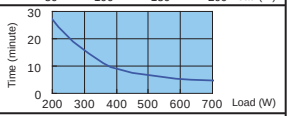
Installation condition

It is recommended to install the power supply to the right of the system rack and connect the fan motor under the system rack.



Optional Components Sold Separately

Battery Package

Page	Picture	Model	Type	Shape (size)	Backup Time
P.401		BS05A-P24/2.2L	Lead	5-inch bay fixed type (W×D×H=146×190×37mm)	
P.403		RBS01A-P24/2.2L	Lead	5-inch bay fixed, removable type (W×D×H=146×245×42mm)	
-		BS19A-P48/5.0L	Lead	Width 4U, height 3U size fixed type (W×D×H=164×235×128mm)	
-		PS2866	Ni-MH	6U10HP size VME rack storage type (W×D×H=50.4×169.7×261.9mm)	100W load: approx. 10 minutes

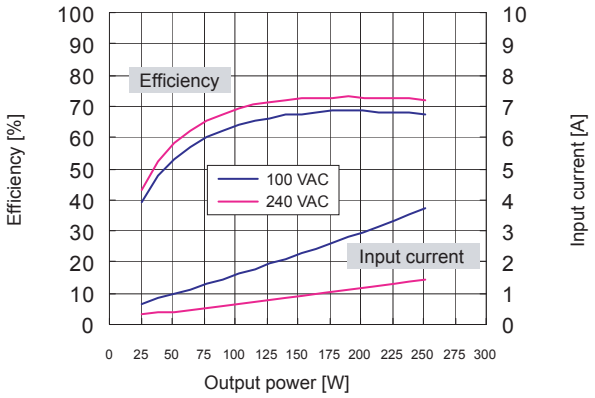
*The backup time is a reference value at initial use; it is not a guaranteed value.
*The battery packages have not acquired safety standard as an optional component of vNSP-300P-X4S.
*Connector part needs to be processed to connect a battery package.
*For PS2866, a backplane board needs to be produced additionally.
*2 units are needed for BS05A-P24/2.2L and RBS01A-P24/2.2L (serial connection).

Parts / Unit

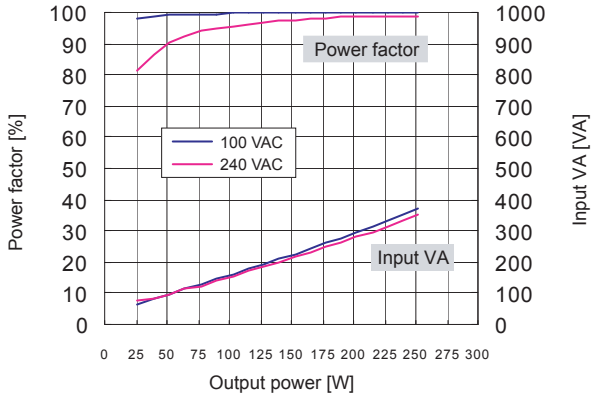
Picture	Model	Type	Description
	ACC2827	Backplane board	A backplane board for vNSP-300P-X4S ORing diode embedded *Backplane board for increasing power with parallel connection can be made as well.

Characteristics Data (Examples of actual measurement)

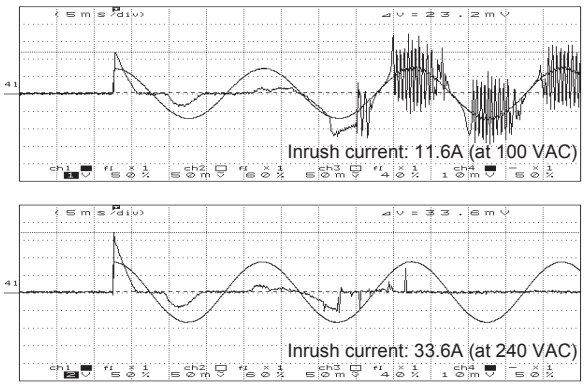
● Fig.2 Efficiency / Input Current vs. Output Power



● Fig.3 Power Factor / Input VA vs. Output Power



● Fig.4 Inrush Current



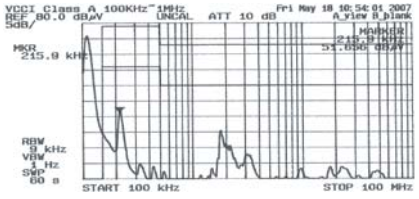
● Fig.5 Leakage Current

Input: 100 / 240 VAC
Load: Rated and min. load

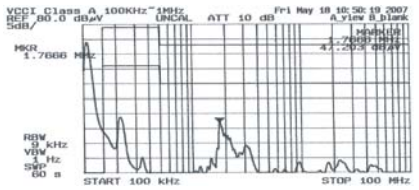
	Rated load	Min. load
100 VAC	0.19mA	0.18mA
240 VAC	0.58mA	0.57mA

● Fig.6 Conducted Emission at 100 VAC

Input: 100 VAC
Load: Rated
Mode: AV



Measuring point: L-FG

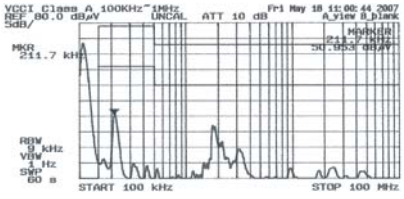


Measuring point: N-FG

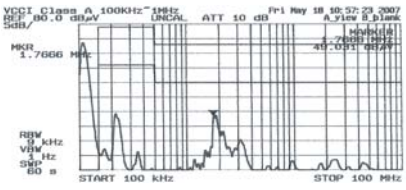
In-house measurement data

● Fig.7 Conducted Emission at 240 VAC

Input: 240 VAC
Load: Rated
Mode: AV



Measuring point: L-FG

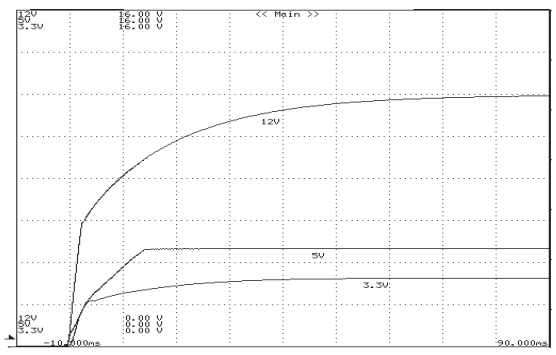


Measuring point: N-FG

In-house measurement date

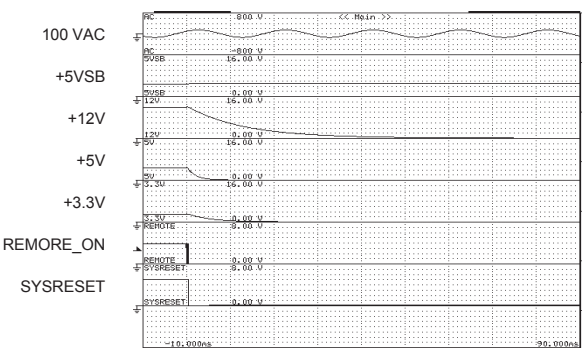
● Fig.8 Rising Characteristics at 100 VAC

Input: 100 VAC
Load: Rated
Time axis: 10ms/DIV



● Fig.9 Falling Characteristics at 100 VAC when REMOTE goes Off

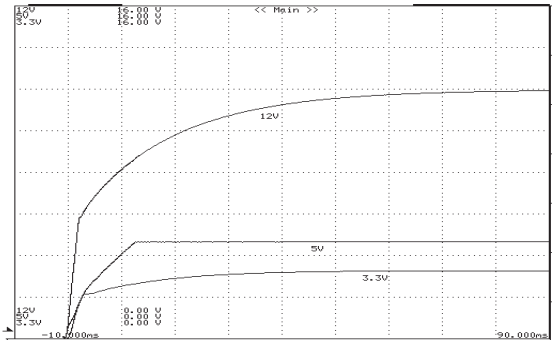
Input: 100 VAC
Load: Rated
Time axis: 10ms/DIV



Characteristics Data (Examples of actual measurement)

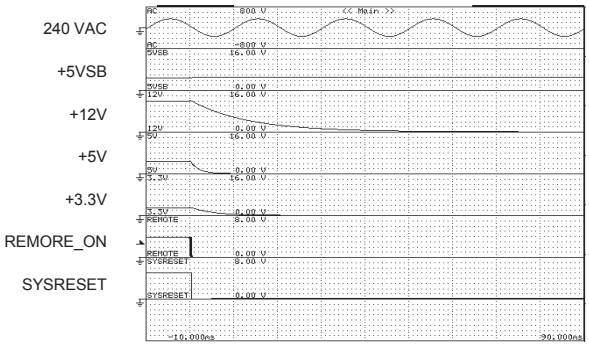
● Fig.10 Rising Characteristics at 240 VAC

Input: 240 VAC
Load: Rated
Time axis: 10ms/DIV



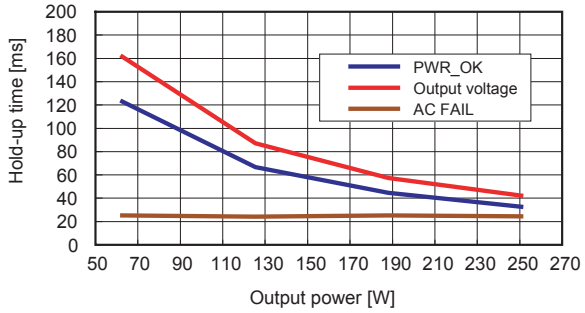
● Fig.11 Falling Characteristics at 240 VAC when REMOTE goes Off

Input: 240 VAC
Load: Rated
Time axis: 10ms/DIV



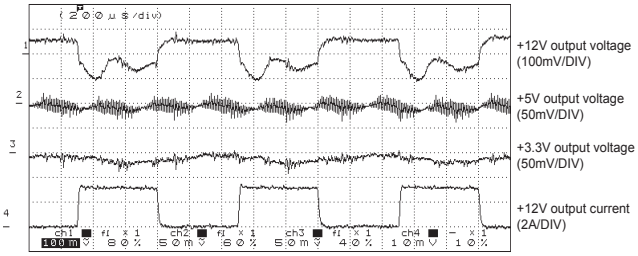
● Fig.12 Output Hold-up Time vs. Output Power

PWR_OK: the point that PWR_OK signal goes to "L"
Output voltage: the point any output voltage decreases to 95% except +5VSB
AC FAIL: the point that AC FAIL signal is delivered



● Fig.13 Dynamic Load Fluctuation Characteristics at 1kHz

Input: 100 VAC
Load: Rated
Time axis: 200μs/DIV



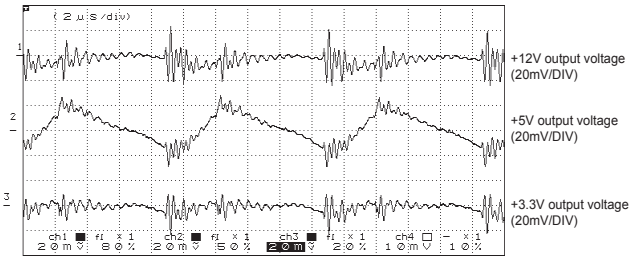
● Fig.14 Output Voltage Regulation

Output	Min. load	Rated load	Peak load
+12V output	0A	3A	7A
+5V output	2A	35A	40A
+3.3V output	0A	4A	17A

AC input voltage	85 VAC	100 VAC	132 VAC	176 VAC	240 VAC	264 VAC
+12V output (min. load)	12.060 V	12.065 V	12.066 V	12.067 V	12.068 V	12.067 V
+12V output (rated load)	12.013 V	12.018 V	12.021 V	12.025 V	12.025 V	12.024 V
+12V output (peak load)	11.984 V	11.989 V	11.991 V	11.993 V	11.996 V	11.994 V
+5V output (min. load)	5.237 V	5.236 V	5.236 V	5.237 V	5.241 V	5.241 V
+5V output (rated load)	5.023 V	5.026 V	5.027 V	5.029 V	5.029 V	5.029 V
+5V output (peak load)	4.990 V	4.992 V	4.994 V	4.996 V	4.997 V	4.996 V
+3.3V output (min. load)	3.299 V	3.347 V	3.348 V	3.349 V	3.349 V	3.349 V
+3.3V output (rated load)	3.309 V	3.309 V	3.311 V	3.314 V	3.314 V	3.313 V
+3.3V output (peak load)	3.262 V	3.263 V	3.265 V	3.268 V	3.271 V	3.269 V

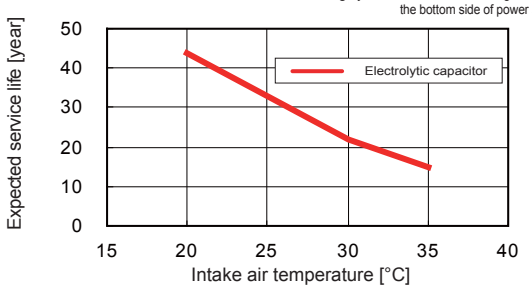
● Fig.15 Ripple and Spike Voltage

Input: 100 VAC
Load: Rated
Time axis: 2μs/DIV



● Fig.16 Ambient Temperature vs. Expected Service Life

Input: 100 VAC
Load: Rated
Operating time: 24 consecutive hours
Cooling system: 15 CFM air is coming from the bottom side of power supply



*Life span for electrolytic capacitor shall be 15 years max. considering the degradation of the sealing plate.

● Fig.17 Over Current Protection (V-I Characteristic)