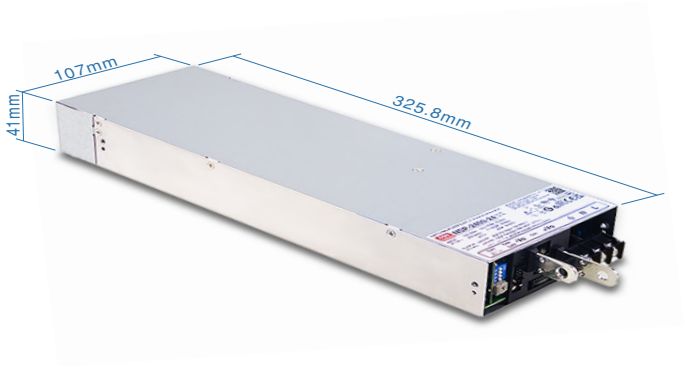


Front

Back

User's Manual

IEC62368-1
IEC61558-1/-2-16
IEC61010-1/-2-201
IEC60601-1
IEC60335-1
IEC62477-1

BS EN/EN62368-1
BS EN/EN61558-1/-2-16
BS EN/EN61010-1/-2-201
BS EN/EN60601-1
BS EN/EN60335-1
BS EN/EN62477-1

UL62368-1
ANSI/AAMI ES60601-1

UL61010-1

AS/NZS61558-1/-2-16
AS/NZS62368-1

GB4943.1

CNS15598-1

KC62368-1
(By request)

IS13252
(By request)

TPTC004

ECO · Automate · Industrial · Security · Network · Telecom · Household · Medical · 2xMOPP · BF rated

Features

- 85~305Vac input with PFC(277Vac available)
- Global certificates in multi-fields (ITE 62368-1, Medical 60601-1, Household 60335-1,Industrial 61558-1/2-16/61010-1/-2-201, Energy converter 62477-1),SEMI47
- 200% peak power capability
- High efficiency up to 93%
- Output voltage 0~120% and output current 0~100% programmable
- Current sharing up to 9600W(3+1) for parallel use
- Built-in OR-ing FET (By request)
- CANBus(Built in) or MODBus protocol (By request)
- -40~85℃ wide range operation temperature(> +60℃ derating)
- Extremely low leakage current<500uA, 2 x MOPP, suitable for BF medical applications
- Built-in constant current limiting circuit
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Built-in remote ON/OFF control/Remote Sense/ DC OK signal
- 5 Vaux and 12 Vaux power
- Over voltage category III (OVC III)
- Operating altitude up to 5000 meters
- Built-in intelligent fan speed control, low noise <45dB
- Conformal coating
- 5 years warranty

Applications

- Industrial automation machinery/ control system
- Security system
- Mechanical and electrical equipment
- Electronic instruments, equipments orapparatus
- Network equipment
- Telecom devices
- Power sourcing equipment of PoE
- Home automation
- Medical devices
- Supercapacitor

Description

The NSP-2400 series is a 2400W AC/DC power supply with PFC function, designed for high reliability and suitable for multiple industries. Key features include: compact size (325.8*107*41mm) for better space utilization in system installations, ultra-wide input range of 85~305Vac for global compatibility, up to 93% efficiency , programmable output voltage (0~120%) and current (0~100%), constant current design with 200% peak power capability, parallel output capacity up to 9600W, built-in CANBus communication interface, wide operating temperature range from -40 to +85℃(+60℃at full load), compliance with OVCIII, built-in Remote Control /Remote Sense/DC OK signal/auxiliary power, internal PCB coating, complete protections, certifications for multiple safety standards including 62368-1, 60601-1, 61558-1, 60335-1, 62477-1, and 61010-1, as well as 2 X MOPP compliance and extremely low leakage current (<500μA). It is suitable for BF-rated medical equipment and comes with a 5-years warranty, making it a highly cost-effective solution for industrial power supply needs.

Model Encoding

NSP - 2400 - 48 MOD

- MOD — Communication protocol option
- 48 — Output voltage (12V/15V/24V/27V/36V/48V/60V)
- 2400 — Output wattage
- NSP — Series name

Type	Communication Protocol	Note
Blank	CANBus protocol	In Stock
MOD	MODBus protocol	By request

SPECIFICATION		NSP-2400-12□	NSP-2400-15□	NSP-2400-24□	NSP-2400-27□	NSP-2400-36□	NSP-2400-48□	NSP-2400-60□
		□ =Blank (standard model in stock), MOD (By request model)						
OUTPUT								
DC VOLTAGE		12V	15V	24V	27V	36V	48V	60V
CURRENT		200A	160A	100A	88.8A	66A	50A	40A
CURRENT RANGE		0 ~ 200A	0 ~ 160A	0 ~ 100A	0 ~ 88.8A	0 ~ 66A	0 ~ 50A	0 ~ 40A
RATED POWER		2400W	2400W	2400W	2397W	2397W	2400W	2400W
PEAK	CURRENT (5 sec.)	400A	320A	200A	177.6A	132A	100A	80A
	POWER (5 sec.)	4800W	4800W	4800W	4794W	4794W	4800W	4800W
RIPPLE & NOISE (max.) Note.3		150mVp-p	150mVp-p	150mVp-p	200mVp-p	200mVp-p	200mVp-p	450mVp-p
VOLTAGE ADJ. RANGE		10.8 ~ 14.4V	13.5 ~ 19V	21.6 ~ 28.8V	24.3 ~ 32.4V	32.4 ~ 43.2V	43.2 ~ 57.6V	54 ~ 72V
VOLTAGE TOLERANCE Note.4		±1.0%						
LINE REGULATION		±0.5%						
LOAD REGULATION		±0.5%						
SETUP, RISE TIME Note.5		1500ms, 60ms/115Vac; 1500ms, 60ms/230Vac; 1500ms, 60ms/277Vac at full load						
HOLD UP TIME (Typ.)		12ms @ 70% load, 8ms @full load						
INPUT								
VOLTAGE RANGE		85 ~ 305Vac 250 ~ 431Vdc						
FREQUENCY RANGE		47 ~ 63Hz						
POWER FACTOR (Typ.)		0.98/115Vac 0.95/230Vac 0.95/277Vac at full load						
EFFICIENCY (Typ.)		89%	90%	91%	91%	91.5%	92%	93%
AC CURRENT (Typ.)		17A/115Vac 12A/230Vac 10A/277Vac						
INRUSH CURRENT (Typ.)		COLD START 30A/115Vac 60A/230Vac 75A/277Vac						
LEAKAGE CURRENT		Earth leakage current <500μA(rms)@277Vac ; Touch current<100μA(rms) @ 277Vac						
PROTECTION								
SHORT CIRCUIT		Shut down o/p voltage, re-power on to recover						
OVERLOAD		Output power >105% rated for more than 5 seconds then shut down o/p voltage, re-power on to recover						
		Constant current limiting for output power >200% rated for more than 5 seconds and then shut down o/p voltage, re-power on to recover						
		User adjustable continuous constant current limiting or constant current limiting with delay shutdown after 5 seconds, re-power on to recover						
OVER VOLTAGE		14.5 ~ 16V	21 ~ 24V	30 ~ 32V	33~ 35V	48 ~ 50V	60 ~ 63V	75 ~ 80V
		Protection type : Shut down and latch off output voltage, re-power on to recover						
OVER TEMPERATURE		Shut down output voltage, recovers automatically after temperature goes down						
FUNCTION								
OUTPUT CURRENT PROGRAMMABLE(PC)		Adjustment of constant current level is allowable between 0 ~ 100% of rated current. Please refer to the Function Manual.						
OUTPUT VOLTAGE PROGRAMMABLE(PV)		Adjustment of output voltage is allowable to 0 ~ 120% of nominal output voltage. Please refer to the Function Manual.						
PARALLEL		Up to 9600W or (3+1) units. Please refer to the Function Manual.						
AUXILIARY POWER		5Vaux @ 0.2A Tolerance ±15%, ripple 150mVp-p						
		12Vaux @ 0.8A Tolerance ±15%, ripple 450mVp-p						
REMOTE CONTROL		By electrical signal or dry contact Power ON: RC short Power OFF: RC open						
REMOTE SENSE		Compensate voltage drop on the load wiring up to 0.5Vdc						
DC OK SIGNAL		Contact rating(max.):5Vdc/10mA resistive load						
CANBus(BUILT-IN) or MODBus(By Request) INTERFACE		Communication provides functions such as control, setting and monitoring						
FAN SPEED CONTROL(Typ.)	Note.6	Built-in intelligent fan speed control detect by PSU'S internal temperature						
	10% load with Ta=25℃	30dB						
	70% load with Ta=25℃	45dB						
ENVIRONMENT								
WORKING TEMP.		-40 ~ +85℃ (Refer to "Derating Curve")						
WORKING HUMIDITY		20 ~ 90% RH non-condensing						
STORAGE TEMP., HUMIDITY		-40 ~ +85℃, 10 ~ 95% RH non-condensing						
TEMP. COEFFICIENT		±0.03%/℃ (0 ~ 60℃)						
VIBRATION		10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes						

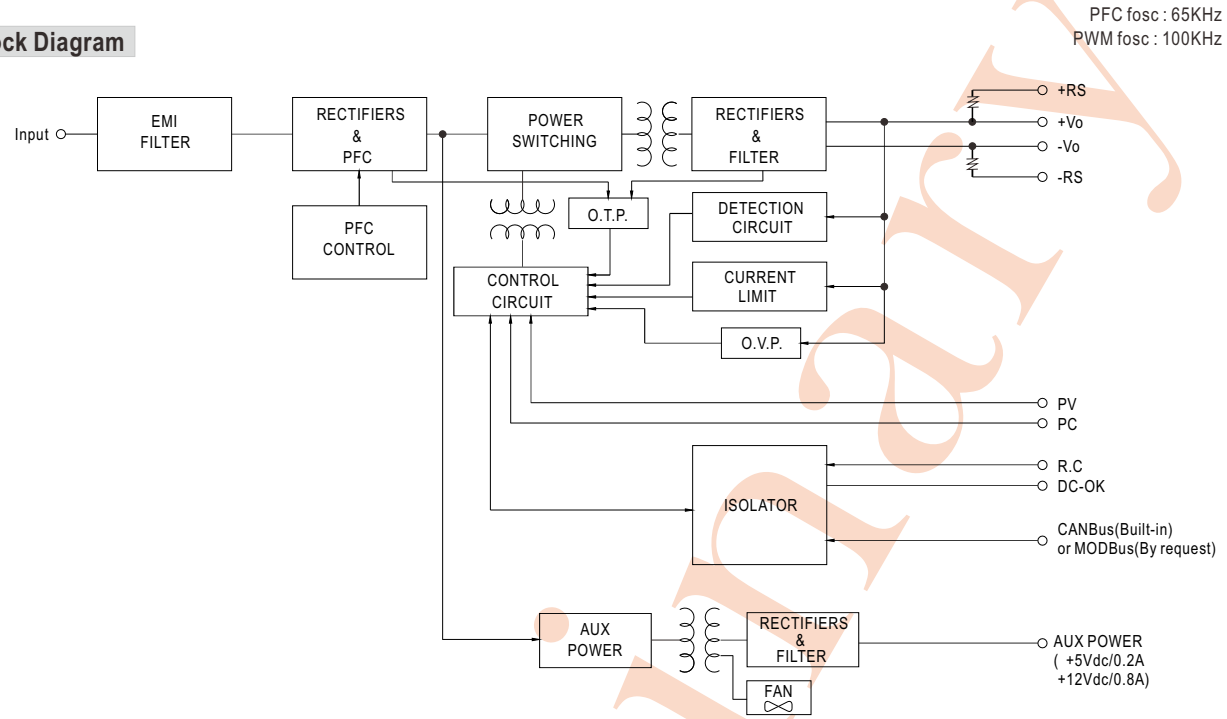
SAFETY & EMC(Note 9)			
SAFETY STANDARDS	CB IEC62368-1, IEC60335-1, IEC61558-1/-2-16, IEC61010-1/-2-201, IEC60601-1; IEC62477-1 DEKRA BS EN/EN62368-1, BS EN/EN60335-1, BS EN/EN61558-1/-2-16, BS EN/EN61010-1/-2-201, BS EN/EN60601-1(3.2 Version);BS EN/EN62477-1 UL UL62368-1, ANSI/AAMI ES60601-1(3.2 Version),UL61010-1/-2-201 RCM AS/NZS 62368-1, AS/NZS61558-1/-2-16 CQC GB4943.1 BSMI CNS15598-1 EAC TP TC 004 approved KC/BIS KC62368-1 and BIS IS 13252(Part1): 2010 certified, IEC 60950-1 : 2005(except for 48V/60V), no stock by request, contact sale for inquires		
ISOLATION LEVEL Note.8	Primary-Secondary: 2xMOPP, Primary-Earth: 1xMOPP, Secondary-Earth: 1xMOPP		
OVER VOLTAGE CATEGORY	IEC/EN 61558-1/-2-16 (OVC III, altitude up to 2000M) IEC/EN/UL 62368-1 (OVC II, altitude up to 5000M) IEC/EN 60335-1 (OVC II, altitude up to 5000M) IEC/EN 60601-1 (OVC II, altitude up to 4000M) IEC/EN 61010-1/-2-201 (OVC II, altitude up to 5000M)		
SAFETY EXTRA-LOW VOLTAGE(SELV)	IEC/EN 61558-2-16 (SELV, 5 ~ 36V) IEC/EN 60335-1 (SELV, 5 ~ 36V) IEC/EN/UL 62368-1 (SELV/ES1, 5 ~ 36V)		
WITHSTAND VOLTAGE	I/P-O/P:4KVac I/P-FG:2KVac O/P-FG:1.5KVac		
ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH		
EMC EMISSION	**Parameter**	**Standard**	**Test Level / Note**
	Conducted	BS EN/EN55032(CISPR32),CNS 15936	Class B
		BS EN/EN55014-1(CISPR14-1)	
		BS EN/EN55011(CISPR11)	Class B
	Radiated	BS EN/EN55032(CISPR32),CNS 15936	Class B
		BS EN/ENEN55014-1(CISPR14-1)	
		BS EN/EN55011(CISPR11)	Class B
	Harmonic Current	BS EN/EN61000-3-2(IEC61000-3-2)	Class A
	Voltage Flicker	BS EN/EN61000-3-3(IEC61000-3-3)	-----
EMC IMMUNITY	BS EN/EN55035(CISPR35),BS EN/EN61000-6-2(IEC61000-6-2),BS EN/EN60601-1-2(IEC60601-1-2), BS EN/EN55014-2(CISPR14-2)		
	Parameter	**Standard**	**Test Level / Note**
	ESD	BS EN/EN61000-4-2	Level 4, 15KV air ; Level 4, 8KV contact
	Radiated	BS EN/EN61000-4-3	Level 3, 10V/m(80MHz~2.7GHz) Table 9, 9~28V/m(385MHz~5.78GHz)
	EFT / Burst	BS EN/EN61000-4-4	Level 3, 2KV
	Surge	BS EN/EN61000-4-5	Level 4, 2KV/Line-Line 4KV/Line-Earth
	Conducted	BS EN/EN61000-4-6	Level 3, 10V
	Magnetic Field	BS EN/EN61000-4-8	Level 4, 30A/m
	Voltage Dips and Interruptions	BS EN/EN61000-4-11	>95% dip 0.5 periods, 30% dip 25 periods, >95% interruptions 250 periods
OTHERS			
MTBF	684.7K hrs min. Telcordia SR-332 (Bellcore) ; 69.2K hrs min. MIL-HDBK-217F (25℃)		
DIMENSION (L*W*H)	**325.8*107*41mm**		
PACKING	Kg		

NOTE

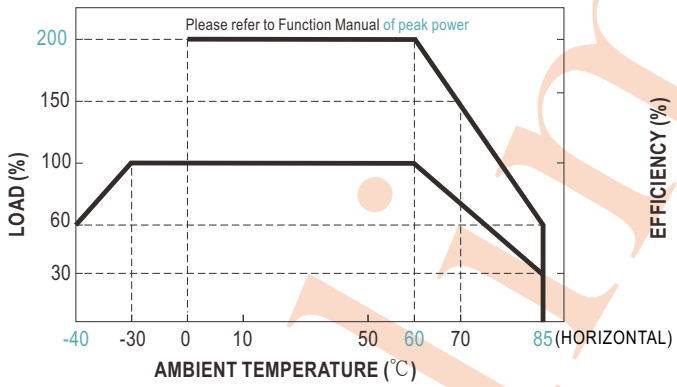
1. All parameters NOT specially mentioned are measured at 230Vac input, rated load and 25℃ of ambient temperature.
2. Derating may be need under low input voltages. Please refer to "STATIC CHARACTERISTIC" sections for details.
3. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF & 47uF parallel capacitor.
4. Tolerance: includes set up tolerance, line regulation and load regulation.
5. Length of set up time is measured at first cold start. Turning ON/OFF the driver may lead to increase of the set up time.
6. FAN noise test set up according to ISO-7779.
7. The power supply is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete installation, the final equipment manufacturers must re-qualify EMC Directive on the complete installation again.
8. MOPP is suitable for 100-240Vac input only.
9. The ambient temperature derating of 3.5℃/1000m with fanless models and 5℃/1000m with fan models for operating altitude higher than 2000m(6500ft).

※ Product Liability Disclaimer：For detailed information, please refer to https://www.meanwell.com/serviceDisclaimer.aspx

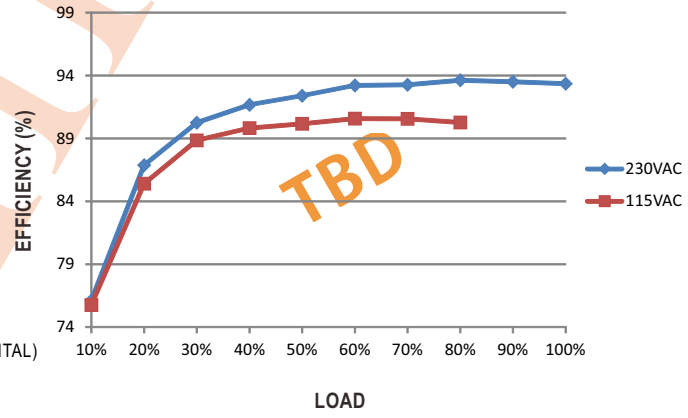
Block Diagram



Derating Curve

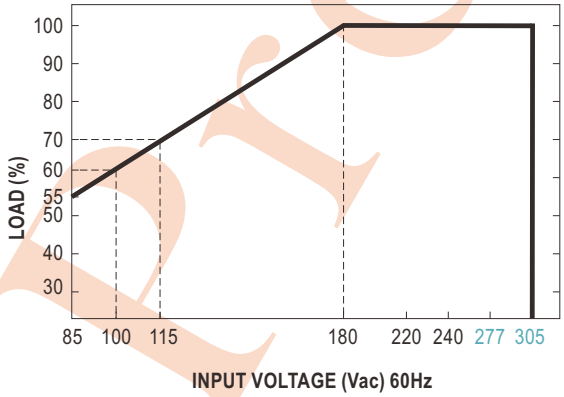


Efficiency vs Load (48V Model)



◎ The curve above is measured at 115/230Vac.

Static Characteristics



■ Function Manual

1.Peak Power

$$P_{av} = \frac{P_{pk} \times t + P_{npk} \times (T-t)}{T} \leqslant P_{rated}$$

$$Duty = \frac{t}{T} \times 100\% \leqslant 35\%$$

$t \leqslant 5$ sec

P_{av} : Average output power (W)

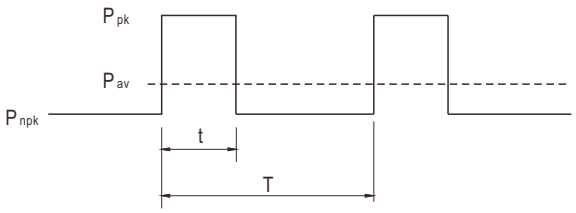
P_{pk} : Peak output power (W)

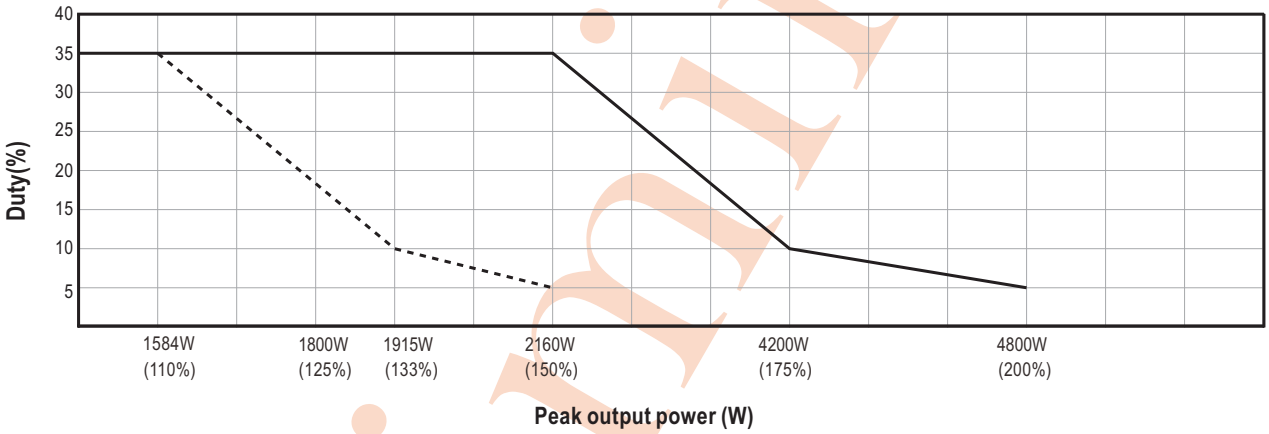
P_{npk} : Non-peak output power (W)

P_{rated} : Rated output power (W)

t : Peak power width (sec)

T: Period (sec)





For example (24V model)

V_{in}=220Vac, Duty_max=5%

$P_{av}=P_{rated}$=2400W

P_{pk}=4800W

t≤5sec

$$T \geq \frac{5sec}{5\%} = 100sec$$

$$P_{npk} \leq \frac{TP_{av}-tP_{pk}}{T-t} = 2273.8W$$

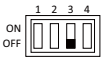
Note:

Input ≥ 200 Vac: Peak power = 2 × rated power

Input < 200 Vac: Peak power = 1.5 × rated power

2.Output Voltage Programming(P.V)

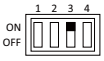
(1)Default by potentiometer (SVR)



(a)Have the DIP switch position-3 set as

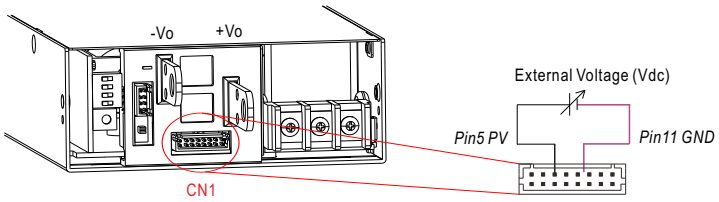
(b)Output voltage can be trimmed by SVR.

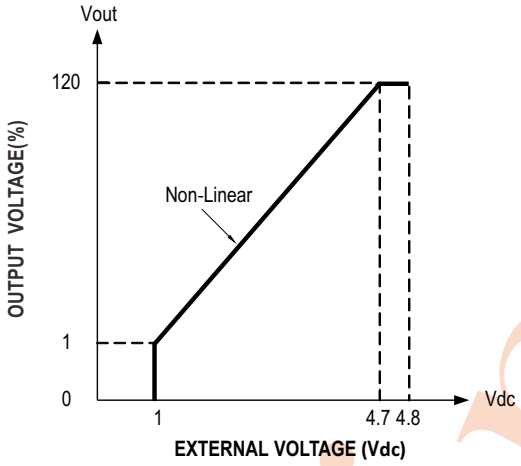
(2)By Output Voltage Programming



(a)Have the DIP switch position-3 set as

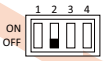
(b)The output voltage can be trimmed to 0~120% by applying EXTERNAL VOLTAGE between *PV* and GND on CN1.





3.Output Current Programming(P.C)

(1)Default Overload Protection(OLP) value



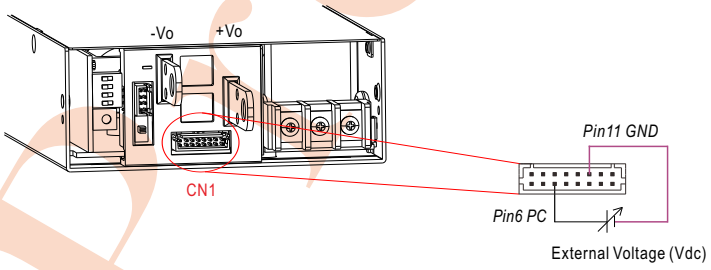
(a)Have the DIP switch position-2 set as

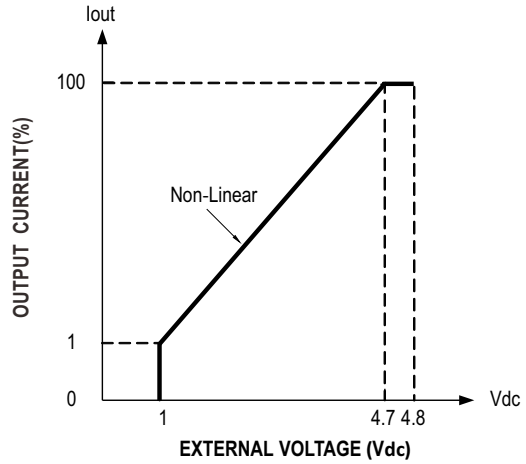
(b)Output current is set default value.

(2)By Constant Current Level Programming

(a)Have the DIP switch position-2 set as

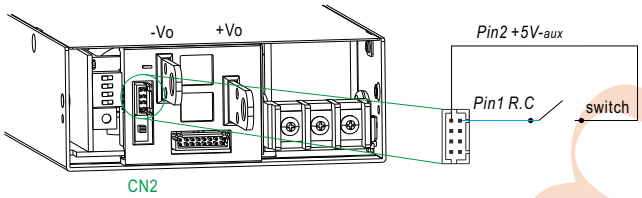
(b)The constant current level can be trimmed to 0~100% of the rated current by applying EXTERNAL VOLTAGE between *PC* and *GND* on CN1.



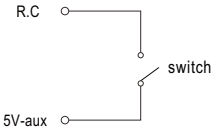
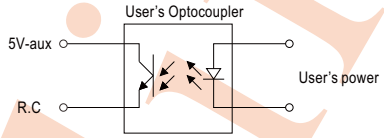
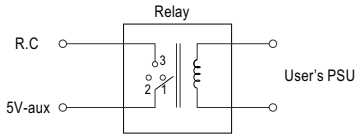


4.Remote Control

※ The power supply can be turned ON/OFF individually or along with other units by using the "Remote Control" function with external switch, potocoupler or relay.

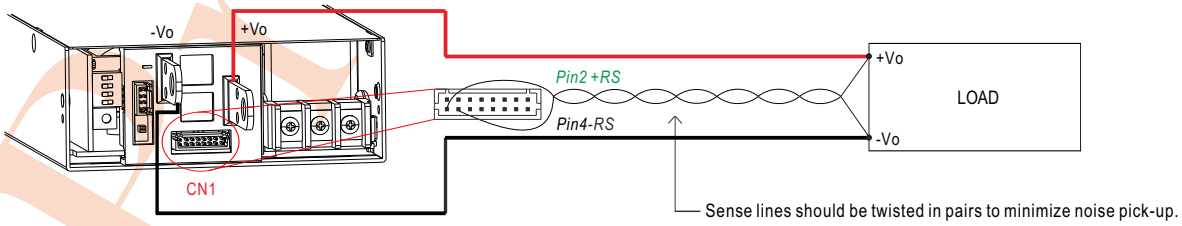


PSU Vo Status	Between +5V-aux(Pin 2) and R.C(Pin 1)
Power ON	Switch Short
Power OFF	Switch Open

		
R.C. by external switch.	R.C. by user's optocoupler control module.	R.C. by user's Relay control module.

5.Remote Sense

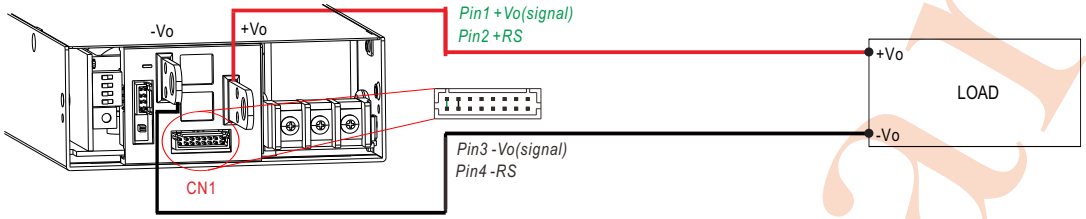
※ The Remote Sense compensates voltage drop on the load wiring up to 0.5Vdc



◎ The +*RS* signal should be connected to the positive terminal of the load whereas -*RS* signal to the negative terminal.

6.Local Sense

※ The +RS,-RS have to be connected to the +Vo(signal), -Vo(signal), respectively, as the following diagram, in order to get the correct output voltage if Remote Sense is not used.



7. Paralled Use

NSP-2400 has the built-in active current sharing function and can be connected in parallel, up to 4 units, to provide higher output power as exhibited below :

(1)The power supplies should be paralleled using short and large diameter wiring and then connected to the load.

(2)Difference of output voltages among parallel units should be less than 0.2Vdc.

(3)The total output current must not exceed the value determined by the following equation:

Maximum output current at parallel operation=(Rated current per unit)×(Number of unit)×0.9

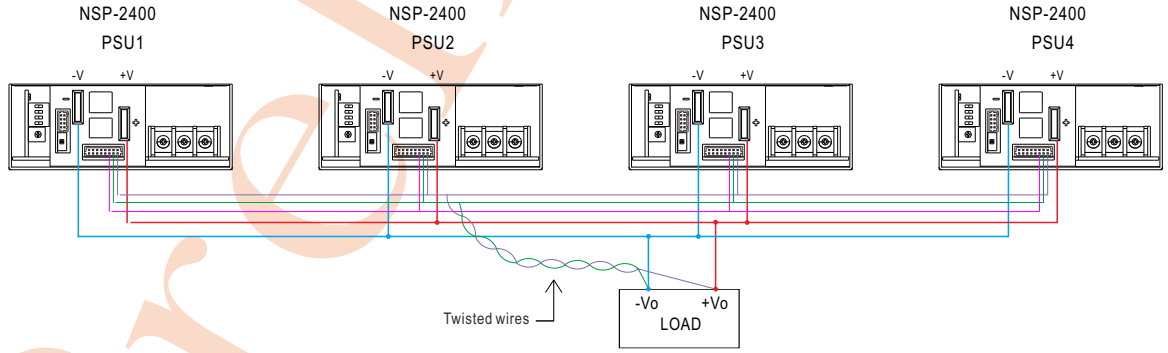
(4)Under parallel operation, the minimum output load should be greater than 5% of total output load; otherwise, it is likely that only one unit operates whereas other units may enter standby mode or their LED status indicators may not turn on.

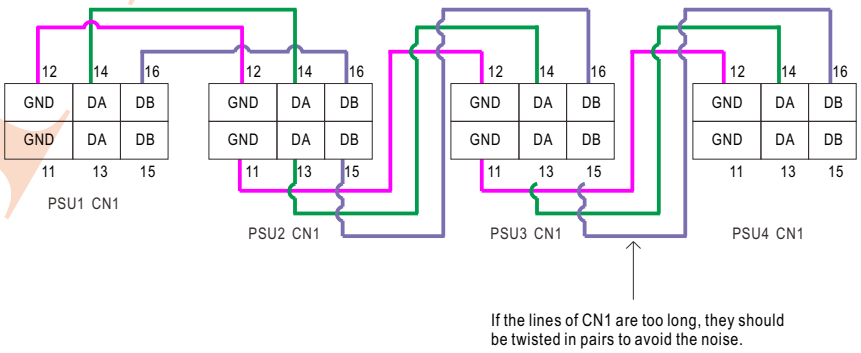
(5)When the total output current is less than 5% of the total rated current, or say (5% of Rated current per unit)×(Number of unit) the current shared among units may not be fully balanced.

(6)CN1/SW1 Function pin connection

Parallel	PSU1		PSU2		PSU3		PSU4	
	CN1	SW1 Pin4	CN1	SW1 Pin4	CN1	SW1 Pin4	CN1	SW1 Pin4
1 unit	X	✓	—	—	—	—	—	—
2 unit	✓	✓	✓	✓	—	—	—	—
3 unit	✓	✓	✓	X	✓	✓	—	—
4 unit	✓	✓	✓	X	✓	X	✓	✓

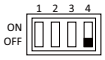
◎ ✓ is CN1/DIP SW1 connected to plug pin, X is CN1/DIP SW1 not connected to plug pin.



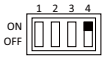


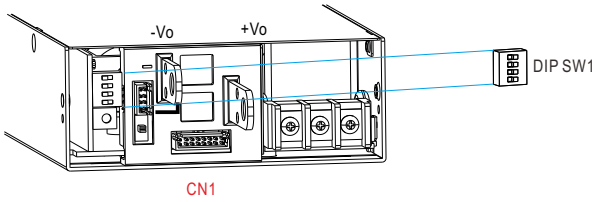
◎ DA,DB and GND are connected mutually in parallel.
◎ DA, DB signal and parallel control function

(1)Non-parallel operation
(a)set the DIP switch of postion-4 as
(b)By default, non-parallel operation.



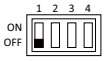
(2)Default parallel operation
(a)set the DIP switch of postion-4 as
(b)PSUs are configured in parallel operation.



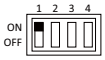


8. Select Overload Protection Type

(1)The Overload Protection Type will be "constant current limiting with delay shutdown after 5 seconds, re-power on to recover". This is the factory default
(a)Have the DIP switch position-1 set as
(b)Peak power function enabled



(2)The Overload Protection Type will be "continuous constant current limiting"
(a)Have the DIP switch position-1 set as
(b)Peak power function disabled



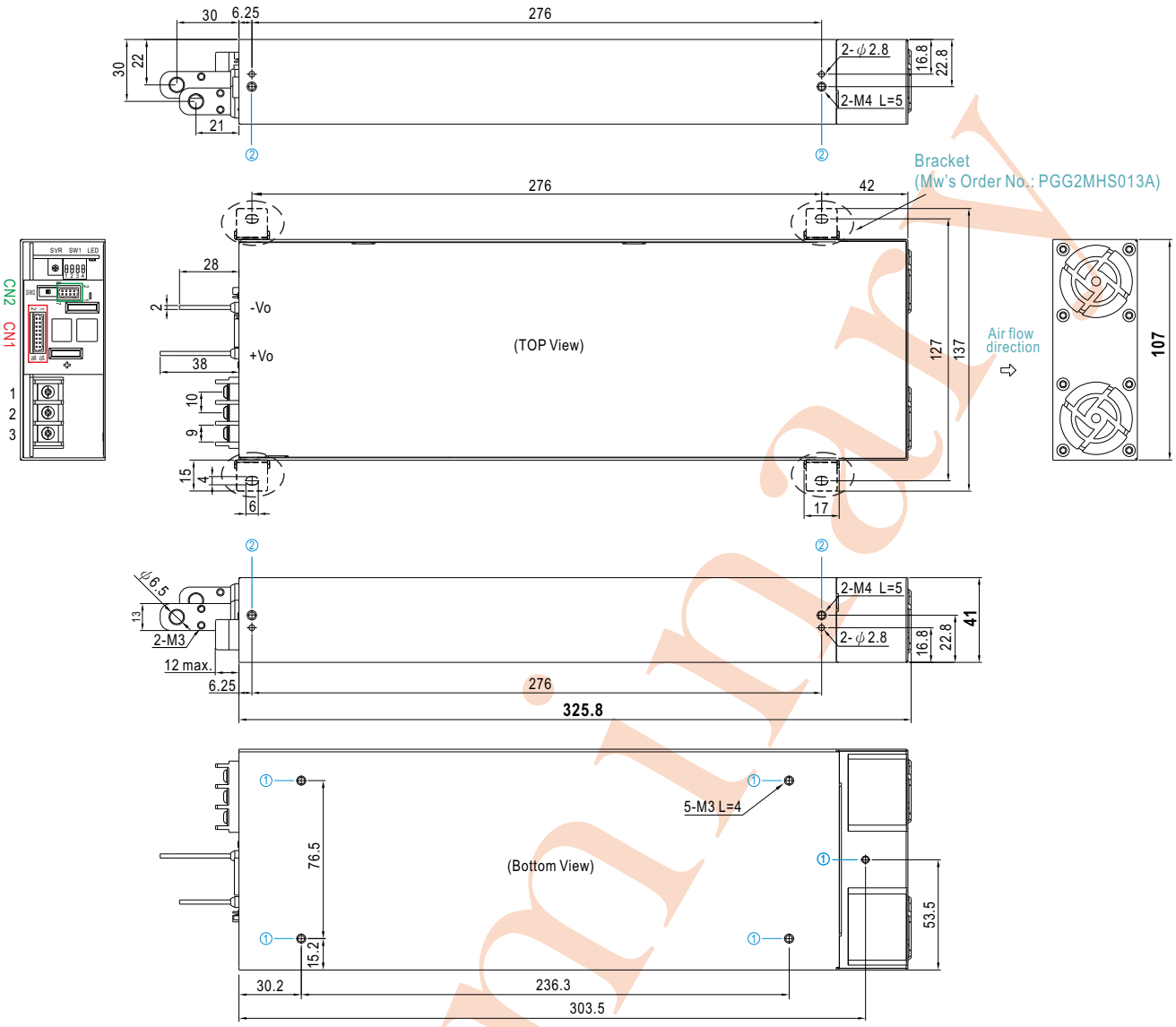
9. Support CANBus(Built-in) or MODBus Communication(By request)

※ Communication provides function such as control, setting and monitorin , Parameters include output power, input voltage,ect.
For more details, please refer to: http://www.meanwell.com/manual.html

■ Mechanical Specification

(Unit: mm , tolerance ±0.5mm)

Case No.294A

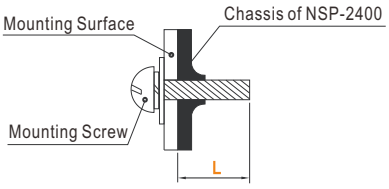


※ AC Input Terminal Pin No. Assignment

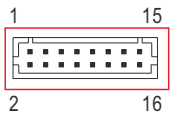
Pin No.	Assignment	Diagram	Screw Thread	Max. mounting torque
1	FG ⏚	1 2 3	M3.5	8Kgf-cm
2	AC/N			
3	AC/L			

※ Mounting Instruction

Hole No.	Recommended Screw Size	MAX. Penetration Depth L	Recommended mounting torque
①	M3	4mm	6~8Kgf-cm
②	M4	5mm	7~10Kgf-cm



※Control Pin No. Assignment (CN1) : HRS DF11-16DP-2DS or equivalent

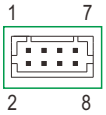


Mating Housing	HRS DF11-16DS or equivalent
Terminal	HRS DF11-**SC or equivalent

Pin No.	Function	Description
1	+Vo (Signal)	Positive output voltage signal. It is for local sense; it cannot be connected directly to the load.
2	+RS	Positive sensing for remote sense.
3	-Vo (Signal)	Negative output voltage signal. It is for local sense and certain function reference; it cannot be connected directly to the load.
4	-RS	Negative sensing for remote sense.
5	PV	Connection for output voltage programming. (Note.1)
6	PC	Connection for constant current level programming. (Note.1)
7,8,9,10	A0,A1,A2,A3	Interface address lines. (Note.2)
11,12	GND	These pins connect to the negative terminal (-Vo).
13, 14	DA	Differential digital signal for parallel control.
15, 16	DB	Differential digital signal for parallel control.

Note1: Non-isolated signal, referenced to [-Vo(signal)].

※ Control Pin No. Assignment(CN2) : HRS DF11-08DP-2DS or equivalent

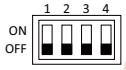


Mating Housing	HRS DF11-08DS or equivalent
Terminal	HRS DF11-**SC or equivalent

Pin No.	Function	Description
1	R.C	The unit can turn the output ON/OFF by electrical signal or dry contact between R.C and +5V-aux. (Note) Short (4.5 ~ 5.5Vdc) : Power ON ; Open (-0.5 ~ 0.5Vdc) : Power OFF ; The maximum input voltage is 5.5Vdc.
2	+5V-AUX	Auxiliary voltage output, 4.25~5.75Vdc, referenced to GND-aux (pin2). The maximum load current is 0.2A. This output has the built-in "Oring diodes" and is not controlled by "R.C"
3	$\overline{\text{DC-OK}}$	High (3.5 ~ 5.5Vdc) : When the Vout ≦77%±5%. Low (-0.5 ~ 0.5Vdc) : When Vout ≧80%±5%. The maximum sourcing current is 10mA and only for output. (Note)
4,6	GND-AUX	Auxiliary voltage output GND. The signal return is isolated from the output terminals (+V & -V).
5	+12V-AUX	Auxiliary voltage output, 10.2~13.8Vdc, referenced to GND-aux (pin2). The maximum load current is 0.8A. This output has the built-in "Oring diodes" and is not controlled by "R.C".
7	D+	For MODBus model: Serial Data used in the MODBus interface. (Note)
	CANH	For CANBus model: Data line used in CANBus interface. (Note)
8	D-	For MODBus model: Serial Clock used in the MODBus interface. (Note)
	CANL	For CANBus model: Data line used in CANBus interface. (Note)

Note: Isolated signal, referenced to GND-aux.

※ DIP Switch Position Assignment(DIP-SW1): Please refer to the Function Manual.

Pin No.	Assignment	Diagram
1	Overload(OLP) type select	
2	Output Current Programming (PC)	
3	Output Voltage Programming (PV)	
4	DA,DB Signal and paralled control function	

DIP-SW PIN1:OL_SD
DIP-SW PIN2:PC
DIP-SW PIN3:PV
DIP-SW PIN4:PRL

※ LED Status Indicators

Description	Output of alarm
Overload	Red : 1 Blink/Pause
Over voltage	Red : 2 Blink/Pause
Over temperature	Red : 3 Blink/Pause
Fan fail	Red : 4 Blink/Pause
Others (Note)	Red : 5 Blink/Pause

Note: Others include protection status SCP、AC UVP and EEPROM error.

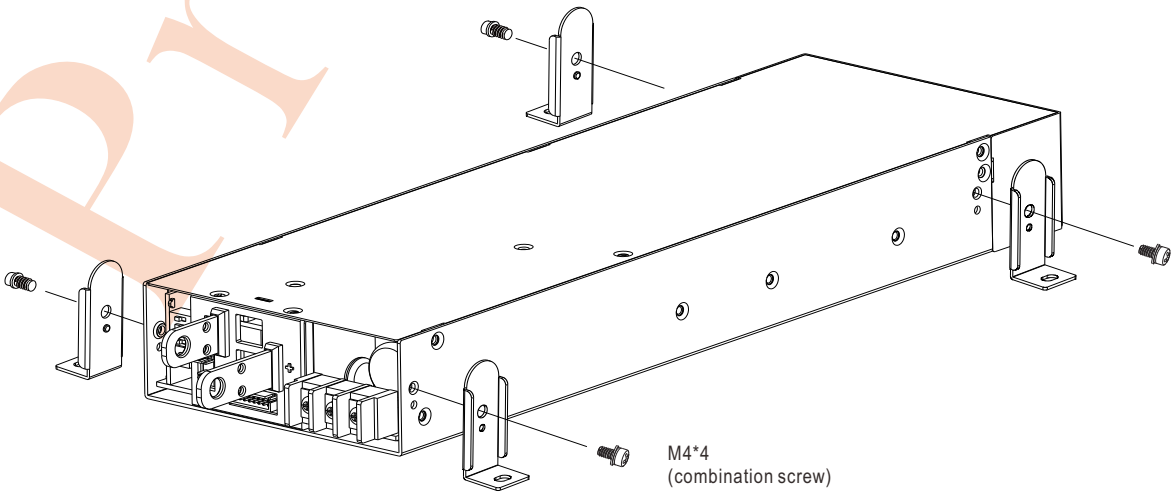
※ Control Pin Assignment SW2

Function	Description
ON	Termination resistors(120Ω). For CANBus/MODBus communication.
OFF	No need to communicate.

■ Accessory List

No.	Item		Quantity
1	Remote Sense(CN1) mating wire along with NSP-2400 (standard accessory)	UL1007 26AWG 16 15 2 1 15 HRS DF11-16DS or equivalent	1pcs/per model
2	Remote Control(CN2) mating wire along with NSP-2400 (standard accessory)	UL1007 26AWG 8 7 2 1 15 HRS DF11-8DS or equivalent	1pcs/per model
3	Bracket Mw's Order No.: PGG2MHS013A (By request accesory, should ordered seperately)		4pcs/per model (Please refer to Installation Diagram)
4	Terminal cover MW'S Order NO. :PEE4TBC-03-DG (By request accessory,should ordered seperatey)	 PEE4TBC-03-DG	1pcs/per model

■ Installation Diagram



■ Installation Manual

Please refer to : http://www.meanwell.com/manual.html