

Product Specification

Created: 12th November, 2019

Description

This specification applies to non-isolated type DC-DC converter.

Model: 100TBFS-2500-280-**

In addition, All items in the specification shall be specified at normal temperature (25°C) and humidity unless otherwise specified.

Model Name code

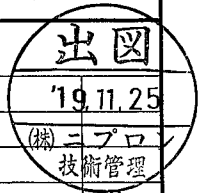
Ex : 100TBFS - 2500 - 280 - **

① ②③ ④ ⑤ ⑥

□ Series name ② Include fan ③ Single ④ Nominal capacity ⑤ Output voltage ⑥ Auxiliary symbols

General Specification

Items		Specification			Measurement condition, etc	
Input specification	Setting	Setting1	Setting 2	Setting 3	Set DIP switch to match the input voltage range (Setting 1/2/3) to the input voltage. For further information, see "Input / Output signal Specification 2" on page 5/7.	
	Rated voltage	24V DC	48V DC	96V DC		
	Input voltage range	19V DC to 37V DC	37V DC to 74V DC	74V DC to 128V DC		
	Boosting start voltage	22±2V DC	42±2V DC	80±3V DC		
	Boosting stop voltage	17±2V DC	34±3V DC	70±4V DC		
	Efficiency	90%(typ.)	94.5%(typ.)	97%(typ.)		At rated Input / Output
	Standby power	8mW(typ.)	30mW(typ.)	120mW(typ.)		Power consumption at remote OFF (At Rated input)
	Protection	Fuse protection				Rated fuse current : 125A
Environment	Operating temperature	-10°C to 60°C			40°C to 60°C reduce load factor from 100% to 60% For further information, see *Note 1 on page 2/7.	
	Storage temperature	-20°C to 75°C				
	Relative humidity	10% to 95% at operation and storage			There shall be no condensation.	
	Vibration	To endure acceleration of 29.4m/s ² with vibration frequency of 5 to 100Hz and sweep cycle period of 3 minutes in the X-, Y-, and Z-direction for one hour each.			According to JIS-C-60068-2-6 At no operation	
	Mechanical shock	Lift one bottom edge 50cm high with the opposite edge Placed on a test bench, and let it fall. Repeat 3 times on other three edges as well and no malfunction shall be observed.			According to JIS-C-60068-2-31 At no operation	
Insulation	Insulation resistance	≥ 50MΩ between input / output / signals (CN1) and FG			At 500V DC	
	Dielectric strength	2kV AC for 1s between input / output / signals (CN1) and FG			Cut-off current lower than 27mA	
Others	Electrostatic discharge immunity	IEC 61000-4-2 (Test level Class 3) Contact discharge : ± 6kV, 10 times			No failure and no operating error	
	First transient burst	IEC61000-4-4 (Installation Environment Class3)			No failure and no operating error	
	Surge immunity	IEC61000-4-5 (Installation Environment Class3) Common mode : ± 2kV, Normal mode : ± 1kV, 5 times for each			No failure	
	Conducted emission	No applicable standard				
	Cooling system	Forced air cooling			The fan motor stops automatically at light loads.	
	Safety standard	EN50178 compliant				
	Dimension	Refer to outline drawing				
	Weight	4kg (typ.)				
	Reliability grade	FA			Nipron's quality criteria	
	Warranty	3 year after delivery: If defects belong to us, the defective unit shall be repaired or replaced at our cost.			Except the operation out of the specification.	



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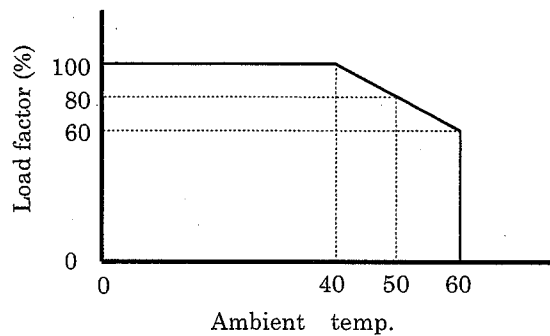
Drawn by	Reviewed by	Approved by	Model	Drawing No.	
H. Konishi	E. Tanaka	S. Miyake	100TBFS-2500-280-**	3638-01-4-520	1/7

Nipron Co., Ltd

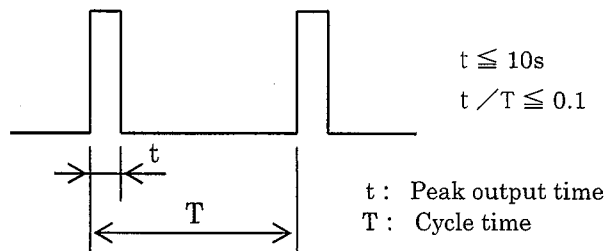
Due to the technical improvement, the specifications and functions are subject to change without notice.

Output Specification		(Items are to be measured at output terminals.)			
Items		Specification			Measurement condition, etc
Setting		Setting1	Setting2	Setting3	
Output specification	Rated voltage	284V DC			
	Rated current	4.23A	8.8A	15.9A	Maximum current / power that can be output continuously. (*Note 1) (*Note 3)
	Rated power	1200W	2500W	4500W	
	Peak current	5.28A	14.1A	17.6A	Within 10s
	Peak power	1500W	4000W	5000W	(*Note 1) (*Note 2) (*Note 3)
	Total voltage accuracy	± 3%			Voltage fluctuation by temperature, input voltage, and load
	Ripple voltage	≤ 5Vp-p			Including spike noise
	Rise time	≤ 1s			The time that output voltage reaches 90% of setting voltage after boosting starts. (At no load)

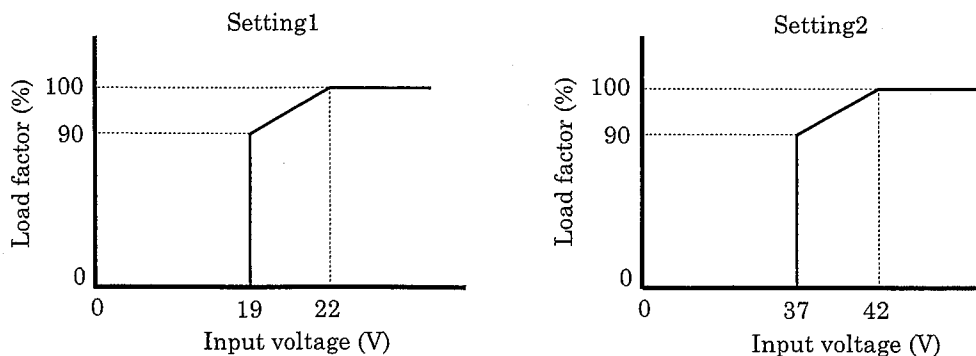
(*Note 1) When the ambient temperature is over 40°C, derate the continuous current / power and the peak current / power according to the derating curve below.



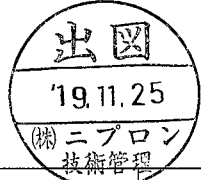
(*Note 2) The time of peak current / power must be within 10s, and the duty ratio (t/T) must be within 0.1.



(*Note 3) When using Setting 1 or Setting 2, derate the continuous current / power and the peak current / power according to the derating curve below.



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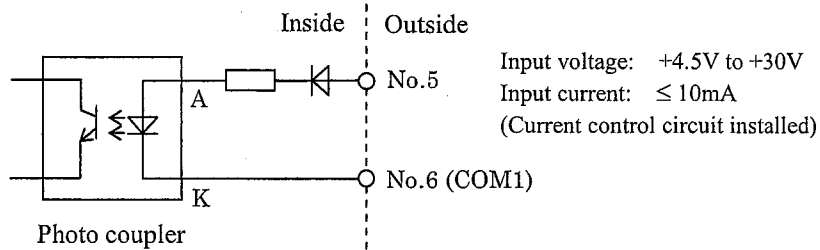
Output Specification 2		(Items are to be measured at output terminals.)					
Items		Specification		Measurement condition, etc			
Protection circuit, Others	Over current protection 1 (OCP1)	Method	Boosting operation stops after about 11s by timer.		When either the input current or output current exceeds OCP1 point and continues for the set time, boosting operation will automatically be stopped. *For details of OCP1, see "Input / Output signal Specification 2 " on page 5/7.		
		OCP 1 Point	By Setting of DIP switch				
		Recovery	Reclosing input or Remote OFF⇒ON				
	Over current protection 2 (OCP2)	Method	Output or input current limiting		When either the input current or output current exceeds OCP2 point, output voltage will automatically be dropped. *For details of OCP2, see "Input / Output signal Specification 2 " on page 5/7.		
		OCP 2 Point	By Setting of DIP switch				
		Recovery	Automatic recovery (However, before OCP1 is activated and output voltage is over UVP point.)				
	Over voltage Protection (OVPin)	Method	Boosting operation stops after about 2s by timer.		When the input voltage exceeds OVPin point and continues for the set time, boosting operation is stopped. *For details of OVPin, see "Input / Output signal Specification 2 " on page 5/7.		
		OVPin Point	By Setting of DIP switch				
		Recovery	Reclosing input or Remote OFF⇒ON				
	Over voltage Protection (OVPOut)	Method	Stop of boosting operation				
		OVPOut point	390±10V DC				
		Recovery	Reclosing input or Remote OFF⇒ON				
	Under voltage Protection (UVP)	Method	Stop of boosting operation		When output voltage is lower than UVP point due to over current protection (OCP2), boosting operation is stopped.		
		UVP point	200±10V DC				
Recovery		Reclosing input or Remote OFF⇒ON					
Over temperature protection	Method	Stop of boosting operation					
	OTP point	Heat sink temp. is 100°C (typ.) or more.					
	Recovery	Reclosing input or Remote OFF⇒ON					
Short-circuit protection	Unsupported		Don't short output since it may damage the components.				
LED indication	Green LED (LED201) shows the operating condition. LED ON : Normal operation Fast blinking : In operation of OCP1 Slow blinking : Protection circuit operated LED OFF : Shutdown		About LED blinking cycle (LED ON time + LED OFF time) Fast blinking : About 0.2s (*Note 4) Slow blinking : About 1s				
Select remote configuration	With the slide switch setting on controlling board, set operation mode as below. "AUTO" mode : When input voltage is higher than "Boosting start voltage", the power supply starts operating automatically. To stop, apply +5V to +24V to pin 5 of "CN1". "REMOTE" mode : When input voltage is higher than "Boosting start voltage", and apply +5V to +24V to pin 5 of "CN1", the power supply starts operating.		*Factory setting : "AUTO"				
Parallel operation	The rated output current and peak current can be increased by using this power supply connected in parallel. (*Note 5)		The maximum number of parallel connection is 3.				
(*Note 4) In the case of pulse load, the LED light may light and blink repeatedly. (*Note 5) At parallel operation, the total current is calculated by the following formula. "Total current ≤ Rated / peak output current (per unit) × The number of units × 0.9"							
							
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Input / Output signal Specification 1

Connector No. Connector type.	Pin No.	Signal	Function
CN1 XARR-06V (Manufacture: JST) or equivalent	1	Operating signal	"L" signal is delivered at normal output. "H"(OPEN) signal is delivered at shutdown or remote OFF.
	2	Over current alarm, Over voltage alarm, Under voltage alarm (*Note 6)	"H" signal is delivered when any of protective functions is activated. (*Note 7)
	3	High temperature alarm	"H" signal is delivered when the internal temperature of power supply exceeds 100°C. (*Note 7)
	4	Fan alarm	"H" signal is delivered when the fan fails.
	5	Remote control signal	At +5V to +24V input, the power supply starts up or stops. (Input acceptable range: +4.5V to +30V) For more details, see "Select remote configuration" on page 3/7.
	6	COM1	GND for CN1 signal
CN3 SMP-07V-NC (Manufacture: JST) or equivalent	1	N.C.	Don't use these pins.
	2		
	3		
	4		
	5		
	6		
	7		

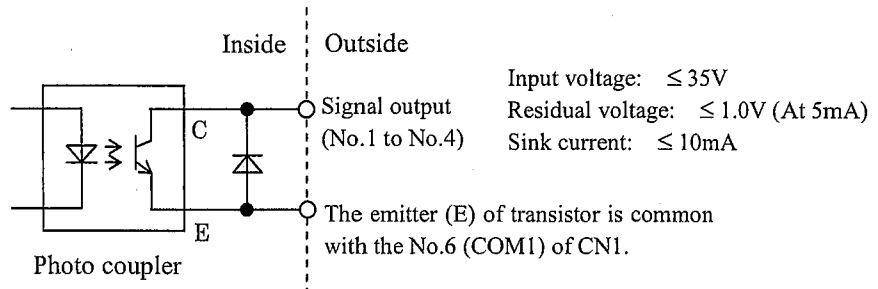
Signal input circuit

CN1 : Pin No.5



Signal output circuit

CN1 : Pin No. 1, 2, 3, 4



(*Note 6) In parallel operation, Under voltage alarm is delivered from only the master unit.

See page 6/7 about master unit and slave unit.

(*Note 7) In order to reset alarm, reclose input or switch remote OFF to ON.



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Input / Output signal Specification 2

Method of changing input voltage range

- To change the input voltage range (Setting 1/2/3), set the DIP switch (SW102) as below.
The factory setting is " Setting 2" (48V DC).
- Over voltage protection and over current protection are automatically set by DIP switch.
- During operation, the configuration cannot to be changed. Set the configuration before the power supply starts up.

	No.1	No.2	No.3	No.4	OCP 1 (OUTPUT)	OCP 1 (INPUT)	OCP 2 (OUTPUT)	OCP 2 (INPUT)	INPUT OVP
Setting 1 (24V DC)	ALL OFF				$\geq 4.3A$	$\geq 69A$	$6 \pm 1A$	$85 \pm 3A$	$\geq 38V$
Setting 2 (48V DC)	ON				$\geq 9A$	$\geq 69A$	$16 \pm 1A$	$110 \pm 3A$	$\geq 75V$
Setting 3 (96V DC)		ON			$\geq 16A$	$\geq 71A$	$19 \pm 1A$	$75 \pm 3A$	$\geq 129V$
Setting 4 to Setting 16	Except above configuration				Disable (Power supply does not operate.)				



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Input / Output signal Specification 3

Warning and cautions in parallel operation

1. Be sure to use the optional parallel cable and busbar (Input, Output, SG terminal).
Parallel cables are daisy chained between CN4 and CN5.
2. The power supply provides independently output signal. Output signal is not linked. As necessary, signals of each power supply can be used.
3. It is necessary to input "Remote control signal" into all power supplies.
Input "Remote control signal" simultaneously or follow the below sequence.

Remote ON : Slave unit ⇒ Master unit (last)
Remote OFF : Master unit (first) ⇒ Slave unit

<About master unit / slave unit >

When all parallel cables are connected, the power supply which is not connected to CN4 becomes automatically the master unit. All the others become slave unit.

4. When the protection circuits (OVP, OCP, UVP, OTP) operate, all power supplies stop operation.
In order to reset protection circuit, reclose input or switch remote OFF to ON for all power supplies.
5. All power supplies must be set to same DIP switch setting. If the settings are different, the power supply will not operate properly.
6. Due to variations in each power supply, there may be a difference in rise time and fall time.



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Warnings and cautions

WARNING ⚠ Electrical shock hazards

This power supply is designed and produced as built-in equipment and has high-voltage part inside. Make sure to securely install in the equipment in a way to prevent electric shock before use.

WARNING ⚠ Input / output short circuit

Prevent shorting input / output terminal with wire and driver.

When input / output terminal is shorted, electric charge in capacitors rapidly discharge leading to fire and spark resulting in serious accident.

WARNING ⚠ Grounding

This power supply is designed and produced as Class I equipment. Make sure to securely connect ground terminal to the ground in a proper way before use.

WARNING ⚠ Adjustment and maintenance

Be sure to cut off the input power before setting DIP switch or performing maintenance.

Power supply may become very hot right after operation. Don't touch power supply directly to avoid burn injury.

CAUTION ⚠ Boosting output voltage circuit

Due to the boosting output voltage circuit structure, input voltage is delivered to output terminal as it is through the internal Diode. Make sure to handle output side very carefully.

CAUTION ⚠ Combination with the inverter (Countermeasure of regenerative voltage)

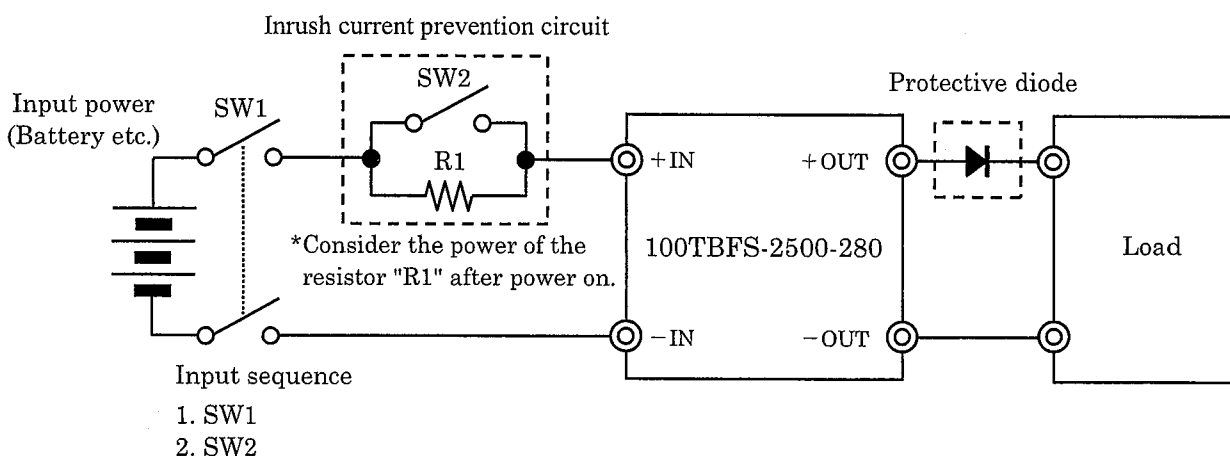
When regenerative voltage is generated by regenerative brake of the inverter, the over voltage protection circuit may be activated and stop boosting. In this case, take measures by adding a protective diode between the power supply and the inverter.

CAUTION ⚠ Inrush current

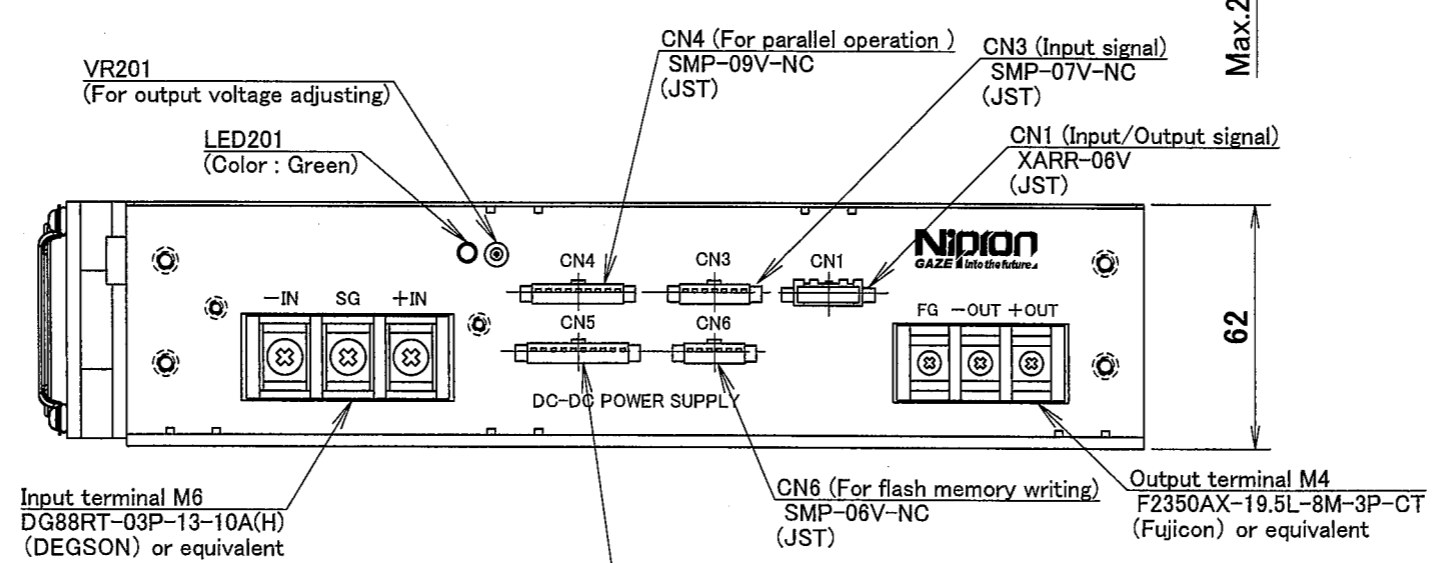
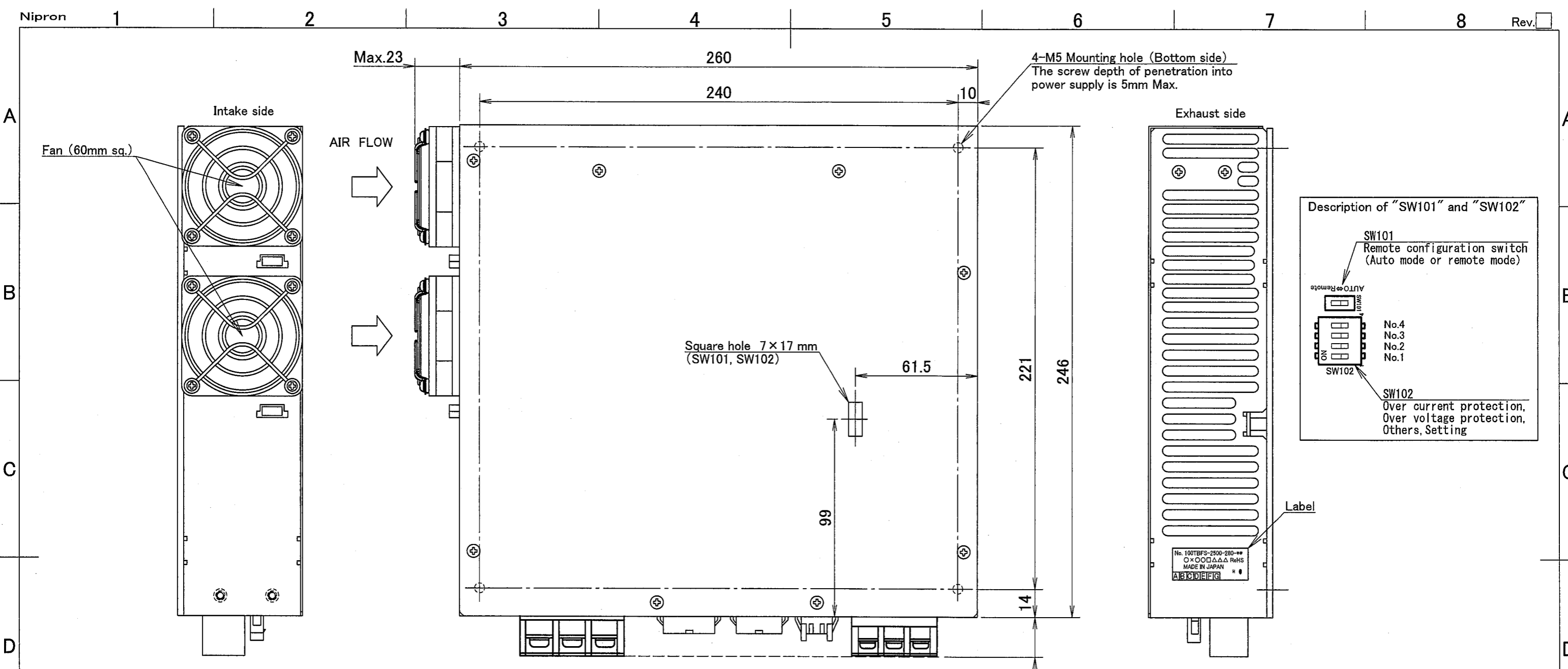
When this power supply is connected to power source on condition that the power supply connected with the load of high input capacity, it may be damaged by excessive inrush current.

If the input power voltage is more than 100V or the load input capacitance is more than 1000 μ F, installing the inrush current prevention circuit (50A max.) is recommended.

Ex: Protective diode / Inrush current prevention circuit



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Description of label

No.100TBFS-2500-280-***
O×OO□△△△ RoHS
MADE IN JAPAN
A B C D E F G H

Contents

Model name : 100TBFS-2500-280-***
(* : Suffix)

Number : O×OO□△△△
①②③④⑤

① 1 digit of production year ④ Production line number
② Production month ⑤ Serial number
③ Production day



Rev. : Frame of product revision is filled.
(ex.) Rev.A ... Only frame of "A" is filled.
Rev.B ... Frame of "A" to "B" is filled.

Note1 : Design tolerance of dimensions is ±1mm.
Note2 : At no parallel operation, nothing can be connected with CN4, CN5 and SG.
Note3 : Keep a distance of 10cm or more from wall, from intake side and exhaust side of the power supply.

DRAWN BY	CHECKED BY	CHECKED BY	APPROVED BY	SCALE	MATERIALS	TITLE	100TBFS-2500 Series
H. Konishi	E. Tanaka	T. Kurokawa	S. Miyake	UNITS			
ISSUED 2019. 11. 13				3RD ANGLE PROJECTION	DRAWING NO.		3638-01-3-550