MEAN WELL MSP-600 Series 600W Single Output Medical Type Owner's Manual

600W Single Output Medical Type

MSP-600 series

■ GTIN CODE

MW Search: https://www.meanwell.com/serviceGTIN.aspx

User's Manual

■ Features

- Universal AC input / Full range
- Built-in active PFC function, PF>0.94
- High efficiency up to 89%
- Withstand 300VAC surge input for 5 seconds
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Medical safety approved (MOOP level)

- Built-in cooling fan ON-OFF control
- Built-in DC OK signal
- Built-in remote ON-OFF control
- Standby 5V@0.3A
- Built-in remote sense function
- No load power consumption<0.8W (Note.7)
- Current sharing up to 2400W (3+1) (24V,36V,48V)
- 5 years warranty

SCIFICATION

MODEL		MSP-600-3.3	MSP-600-5	MSP-600-7.5	MSP-600-12
OUTPUT	DC VOLTAGE	3.3V	5V	7.5V	12V
	RATED CURRENT	120A	120A	80A	53A
	CURRENT RANGE	0 ~ 120A	0 ~ 120A	0 ~ 80A	0 ~ 53A
	RATED POWER	396W	600W	600W	636W
	RIPPLE & NOISE (max.) Note.2	120mVp-p	150mVp-p	150mVp-p	150mVp-p
	VOLTAGE ADJ. RANGE	2.8 ~ 3.8V	4.3 ~ 5.8V	6.8 ~ 9V	10.2 ~ 13.8V
	VOLTAGE TOLERANCE Note.3	±2.0%	±2.0%	±2.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%	±0.5%	±0.3%
	LOAD REGULATION	±1.0%	±1.0%	±1.0%	±0.5%
	SETUP, RISE TIME	1000ms, 50ms/230VAC 2500ms, 50ms/115VAC at full load			
	HOLD UP TIME (Typ.)	16ms/230VAC 16ms/115VAC at full load			

INPUT	**VOLTAGE RANGE** **Note.5**	85 ~ 264VAC 120 ~ 370VDC			
	FREQUENCY RANGE	47 ~ 63Hz			
	POWER FACTOR (Typ.)	PF>0.93/230VAC PF>0.99/115VAC at full load			
	EFFICIENCY (Typ.)	78.5%	82%	86%	88%
	AC CURRENT (Typ.)	8.5A/115VAC 5A/230VAC			
	INRUSH CURRENT (Typ.)	35A/115VAC 80A/230VAC			
	LEAKAGE CURRENT	Earth leakage current < 300 μA/264VAC, Touch leakage current < 100 μA/264VAC			
PROTECTION	**OVERLOAD**	105 ~ 135% rated output power			
		Protection type : Constant current limiting, recovers automatically after fault condition is removed			
	OVER VOLTAGE	3.96 ~ 4.62V	6 ~ 7V	9.4 ~ 10.9V	14.4 ~ 16.8V
		Protection type : Shut down o/p voltage, re-power on to recover			
	OVER TEMPERATURE	Shut down o/p voltage, recovers automatically after temperature goes down			
FUNCTION	**5V STANDBY**	5VSB : 5V@0.3A ; tolerance±5%, ripple : 50mVp-p(max.)			
	DC OK SIGNAL	PSU turn on : 3.3 ~ 5.6V ; PSU turn off : 0 ~ 1V			
	REMOTE CONTROL	RC+ / RC-: 4 ~ 10V or open = power on ; 0 ~ 0.8V or short = power off			
	FAN CONTROL (Typ.)	Load 35±15% or RTH2≧50°C Fan on			
ENVIRONMENT	**WORKING TEMP.**	-40 ~ +70°C (Refer to “Derating Curve”)			
	WORKING HUMIDITY	20 ~ 90% RH non-condensing			
	STORAGE TEMP., HUMIDITY	-40 ~ +85°C, 10 ~ 95% RH non-condensing			
	TEMP. COEFFICIENT	±0.03%/°C (0 ~ 50°C)			

	VIBRATION	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes
SAFETY & EMC (Note 4)	**SAFETY STANDARDS**	IEC 60601-1:2005+A1+A2, ANSI/AAMI ES60601-1:2005+A2, CAN/CSA C22.2 No. 60601-1:2014+A2 EAC TP TC 004 approved; Design refer to BS EN/EN60335-1, BS EN/EN 62368-1(by request)
	ISOLATION LEVEL	Primary-Secondary: 2×MOOP, Primary-Earth: 1×MOOP, Secondary-Earth: 1×MOOP
	WITHSTAND VOLTAGE	I/P-O/P:4KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH
	EMC EMISSION	Compliance to BS EN/EN55011 (CISPR11) Class B, BS EN/EN61000-3-2,-3, EAC TP TC 020
	EMC IMMUNITY	Compliance to BS EN/EN61000-4-2,3,4,5,6,8,11, BS EN/EN60601-1-2, EAC TP TC 020
OTHERS	**MTBF**	138.7K hrs min. MIL-HDBK-217F (25℃)
	DIMENSION	218*105*63.5mm (L*W*H)
	PACKING	1.57Kg;8pcs/13.6Kg/1.34CUFT

NOTE

1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.
2. Ripple & noise are measured at 20MHz of bandwidth by using a 12″ twisted pair-wire terminated with a 0.1 μ F & 47 μ F parallel capacitor.
3. Tolerance : includes set up tolerance, line regulation and load regulation.
4. The power supply is considered a component which will be installed into final equipment. Al the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMG tests, please refer to “EM testing of component power supplies.” (as available on **https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf**)
5. Derating may be needed under low input voltages. Please check the derating curve for more details.
6. Length of set up time is measured at first cold start. Turning ON/OFF the power supply may lead to increase of the set up time.
7. No load power consumption<0.8W when RC+ & RC- (CN100 pin34) 0 ~ 0.8V or short.
8. When the input voltage is less than 40VAC, the SPS may exhibit degradation of performance. The final product manufacturers must re-confirm this deviation that does not affect basic safety or essential performance.
9. The ambient temperature derating of 3.5°C/1000m with fanless models and of 5°C/1000m with fan models for operating altitude higher than 2000m(6500ft).

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MODEL		MSP-600-15	MSP-600-24	MSP-600-36	MSP-600-48
OUTPUT	DC VOLTAGE	15V	24V	36V	48V
	RATED CURRENT	43A	27A	17.5A	13A
	CURRENT RANGE	0 ~ 43A	0 ~ 27A	0 ~ 17.5A	0 ~ 13A
	RATED POWER	645W	648W	630W	624W
	RIPPLE & NOISE (max.) Note.2	150mVp-p	150mVp-p	200mVp-p	240mVp-p
	VOLTAGE ADJ. RANGE	13.5 ~ 18V	21.6 ~ 28.8V	28.8 ~ 39.6V	40.8 ~ 55.2V
	VOLTAGE TOLERANCE Note.3	±1.0%	±1.0%	±1.0%	±1.0%
	LINE REGULATION	±0.3%	±0.2%	±0.2%	±0.2%
	LOAD REGULATION	±0.5%	±0.5%	±0.5%	±0.5%
	SETUP, RISE TIME	1000ms, 50ms/230VAC 2500ms, 50ms/115VAC at full load			
	HOLD UP TIME (Typ.)	16ms/230VAC 16ms/115VAC at full load			
INPUT	VOLTAGE RANGE Note.5	85 ~ 264VAC 120 ~ 370VDC			
	FREQUENCY RANGE	47 ~ 63Hz			
	POWER FACTOR (Typ.)	PF>0.93/230VAC PF>0.99/115VAC at full load			
	EFFICIENCY (Typ.)	88%	88%	89%	89%
	AC CURRENT (Typ.)	8.5A/115VAC 5A/230VAC			

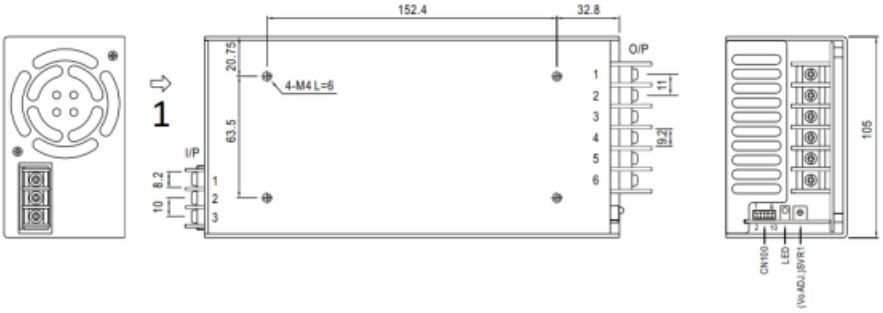
	INRUSH CURRENT (Typ.)	35A/115VAC 80A/230VAC			
	LEAKAGE CURRENT	Earth leakage current < 300 μA/264VAC, Touch leakage current < 100 μA/264VAC			
PROTECTION	**OVERLOAD**	105 ~ 135% rated output power			
		Protection type : Constant current limiting, recovers automatically after fault condition is removed			
	OVER VOLTAGE	18.8 ~ 21.8V	30 ~ 34.8V	41.4 ~ 48.6V	57.6 ~ 67.2V
		Protection type : Shut down o/p voltage, re-power on to recover			
	OVER TEMPERATURE	Shut down o/p voltage, recovers automatically after temperature goes down			
FUNCTION	**5V STANDBY**	5VSB : 5V@0.3A ; tolerance±5%, ripple : 50mVp-p(max.)			
	DC OK SIGNAL	PSU turn on : 3.3 ~ 5.6V ; PSU turn off : 0 ~ 1V			
	REMOTE CONTROL	RC+ / RC-: 4 ~ 10V or open = power on ; 0 ~ 0.8V or short = power off			
	FAN CONTROL (Typ.)	Load 35±15% or RTH2≧50℃ Fan on			
ENVIRONMENT	**WORKING TEMP.**	-40 ~ +70℃ (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 ~ 50℃)			
	VIBRATION	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes			
SAFETY & EMC (Note 4)	**SAFETY STANDARDS**	IEC 60601-1:2005+A1+A2, ANSI/AAMI ES60601-1:2005+A2, CAN/CSA C22.2 No. 60601-1:2014+A2 EAC TP TC 004 approved; Design refer to BS EN/EN60335-1, BS EN/EN 62368-1(by request)			
	ISOLATION LEVEL	Primary-Secondary: 2×MOOP, Primary-Earth: 1×MOOP, Secondary-Earth: 1×MOOP			
	WITHSTAND VOLTAGE	I/P-O/P:4KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC			
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH			
	EMC EMISSION	Compliance to BS EN/EN55011 (CISPR11) Class B, BS EN/EN61000-3-2,-3, EAC TP TC 020			

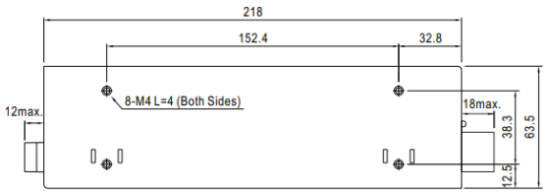
	EMC IMMUNITY	Compliance to BS EN/EN61000-4-2,3,4,5,6,8,11, BS EN/EN60601-1-2, EAC TP TC 020
OTHERS	**MTBF**	138.7K hrs min. MIL-HDBK-217F (25°C)
	DIMENSION	218*105*63.5mm (L*W*H)
	PACKING	1.57Kg;8pcs/13.6Kg/1.34CUFT
NOTE	1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12″ twisted pair-wire terminated with a 0.1 μ F & 47 μ F parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. The power supply is considered a component which will be installed into final equipment. Al the EMC tests are been executed by mounting the unit on a 360mm*360mm metal plate with 1mm of thickness. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMG tests, please refer to “EM testing of component power supplies.” (as available on **https://www.meanwell.com//Upload/PDF/EMI_statement_en.pdf**) 5. Derating may be needed under low input voltages. Please check the derating curve for more details. 6. Length of set up time is measured at first cold start. Turning ON/OFF the power supply may lead to increase of the set up time. 7. No load power consumption<0.8W when RC+ & RC- (CN100 pin34) 0 ~ 0.8V or short. 8. When the input voltage is less than 40VAC, the SPS may exhibit degradation of performance. The final product manufacturers must re-confirm this deviation that does not affect basic safety or essential performance. 9. The ambient temperature derating of 3.5°C/1000m with fanless models and of 5°C/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**

■ Mechanical Specification

(Unit: mm , tolerance ± 1mm)

Case No.977A





1. Airflow direction

AC Input Terminal Pin No. Assignment

Pin No.	Assignment
1	AC/L
2	AC/N
3	FG ⏚

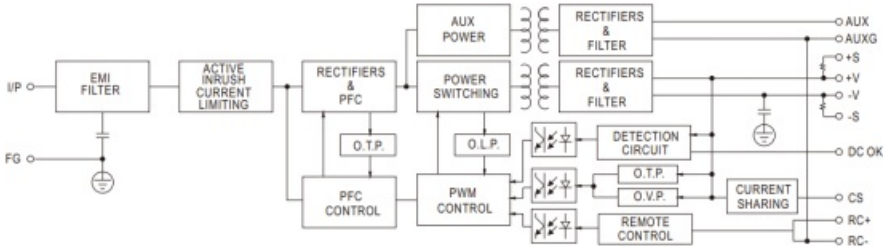
DC Output Terminal Pin No. Assignment

Pin No.	Assignment
1~3	-V
4~6	+V

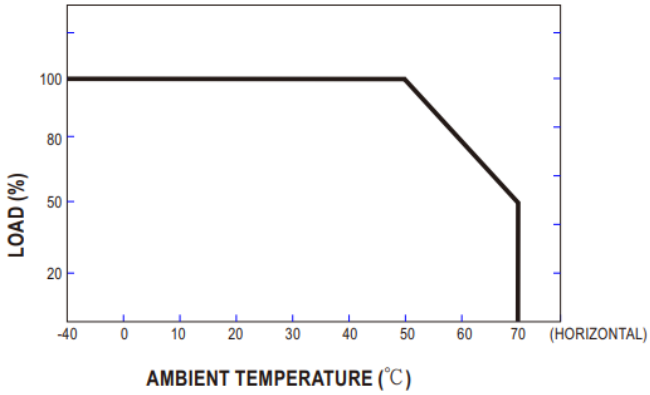
Connector Pin No. Assignment(CN100) : HRS DF11-10DP-2DS or equivalent

Pin No.	Assignment	Mating Housing	Terminal
1	AUXG	HRS DF11-10DS or equivalent	HRS DF11-**SC or equivalent
2	AUX		
3	RC+		
4	RC-		
5	CS		
6,8	GND		
7	DC-OK		
9	+S		
10	-S		

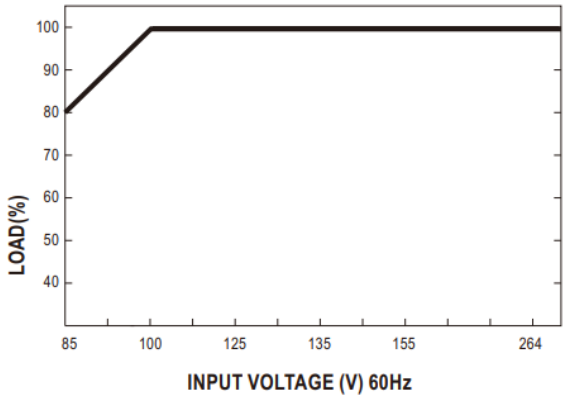
■ Block Diagram



■ Derating Curve



■ Output Derating VS Input Voltage



■ Function Description of CN100

Pin No.	Function	Description
1	AUXG	Auxiliary voltage output ground. The signal return is isolated from the output terminals (+V & -V).
2	AUX	Auxiliary voltage output, 4.75~5.25V, referenced to pin 1(AUXG). The maximum load current is 0.3A. This output is not controlled by the “remote ON/OFF control”.
3	RC+	Turns the output on and off by electrical or dry contact between pin 4 (RC-), Short: Power OFF, Open: Power ON.
4	RC-	Remote control ground.
5	CS	Current sharing signal. When units are connected in parallel, the CS pins of the units should be connected to allow current balance between units.
6, 8	GND	This pin connects to the negative terminal(-V). Return for DC-OK signal output.
7	DC-OK	DC-OK signal is a TTL level signal, referenced to pin8(DC-OK GND). High when PSU turns on.
9	+S	Positive sensing. The +S signal should be connected to the positive terminal of the load. The +S and -S leads should be twisted in pair to minimize noise pick-up effect. The maximum line drop compensation is 0.5V.
10	-S	Negative sensing. The -S signal should be connected to the negative terminal of the load. The -S and +S leads should be twisted in pair to minimize noise pick-up effect. The maximum line drop compensation is 0.5V.

■ Function Manual

1. Remote Sense

The remote sensing compensates voltage drop on the load wiring up to 0.5V.

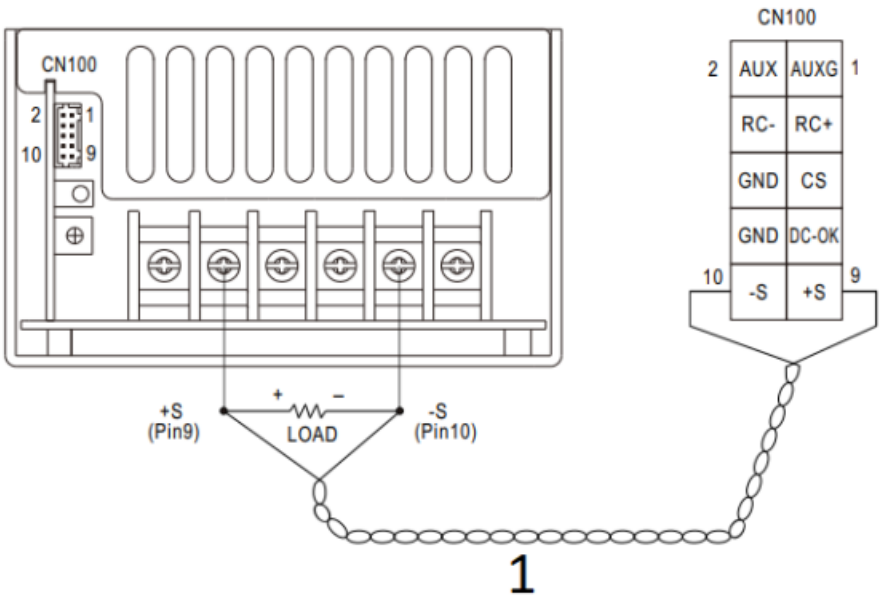


Fig1.1

1. Sense lines should be twisted in pairs

2. DC-OK Signal

DC-OK signal is a TTL level signal. High when PSU turns on.

Between DC-OK(pin7) and GND(pin6,8)	Output Status
3.3 ~ 5.6V	ON
0 ~ 1V	OFF

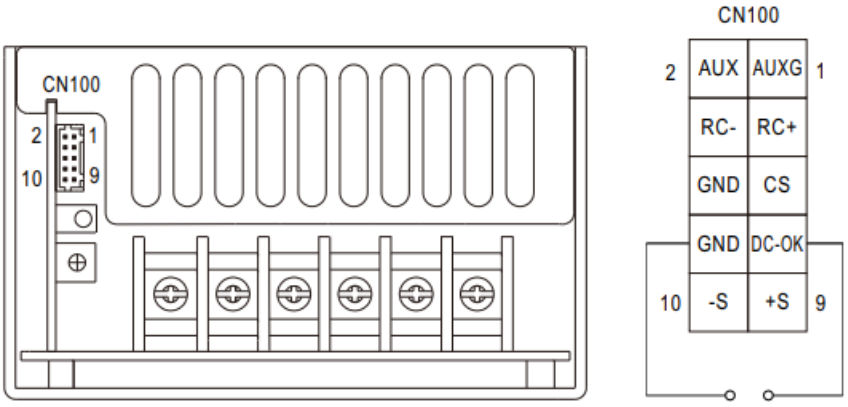


Fig 2.1

3. Remote Control

The PSU can be turned ON/OFF by using the “Remote Control” function.

Between RC+(pin3) and RC-(pin4)	Output Status
SW ON (Short)	OFF
SW OFF (Open)	ON

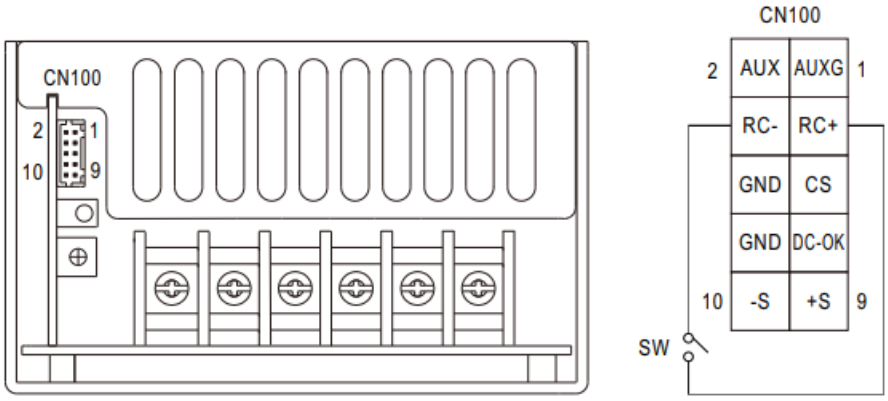


Fig 3.1

4.Current Sharing with Remote Sensing (Only for 24V, 36V and 48V)

MSP-600 has the built-in active current sharing function and can be connected in parallel to provide higher output power :
(1)Parallel operation is available by connecting the units shown as below.
(+S,-S,CS and GND are connected mutually in parallel).
(2)Difference of output voltages among parallel units should be less than 2%.
(3)The total output current must not exceed the value determined by the following equation.
(output current at parallel operation)=(Rated current per unit)×(Number of unit)×0.9
(4)In parallel operation 4 units is the maximum, please consult the manufacturer for applications of more connecting in parallel.
(5)The power supplies should be paralleled using short and large diameter wiring and then connected to the load.

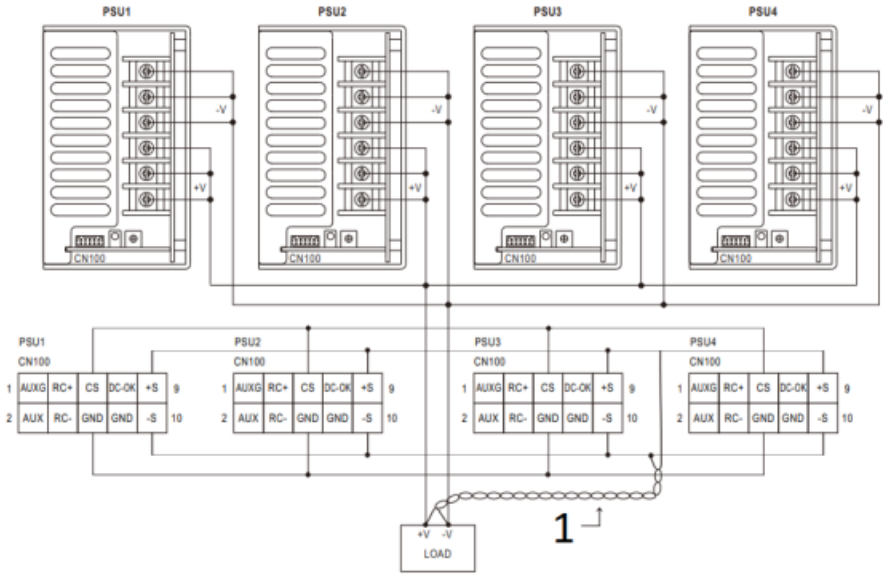


Fig 4.1

1. Sense lines should be twisted in pairs

Note :

1. In parallel connection, maybe only one unit (master) operate if the total output load is less than 2% of rated load condition.
   The other PSU (slave) may go into standby mode and its output LED and relay will not turn on.
2. 2% min. of dummy load is required.

Documents / Resources

	**MEAN WELL MSP-600 Series 600W Single Output Medical Type** [pdf] Owner's Manual MSP-600-3.3, MSP-600-5, MSP-600-7.5, MSP-600-12, MSP-600-15, MSP-600-24, MSP-600-36, MSP-600-48, MSP-600 Series 600W Single Output Medical Type, MSP-600 Series, 600W Single Output Medical Type, Single Output Medical Type, Output Medical Type, Medical Type, Type

References

- **User Manual**