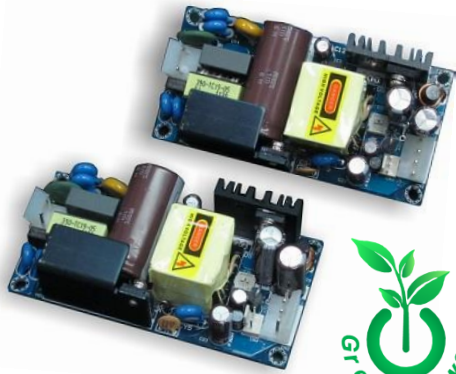


**power supplies for industry**  
**open frame PSU 100W 24VDC**  
**TYPE INR ES 103**  
**NR. 20105**



# Features

- 115W fan cooling, 100W with convection-cooled of single output power supply
- Compact size 2 x 4 inch and low profile
- High efficiency up to 90%
- No-load power consumption < 0.5W
- Optional +5Vsb and remote on/off function
- Class II, also class I with optional functional ground connected
- Design to meet ITE standard IEC 60950-1, EN 60950-1, UL 60950-1
- Meets EMI CISPR/FCC class B
- PFC meet EN 61000-3-2 Class A and EN 61000-3-3

## 1. Description

Output Voltage	Mini. Output Current	Rated Output Current	Max. Output Current	Line Regulation <sup>(Note 5)</sup>	Load Regulation <sup>(Note 5)</sup>	Ripple & Noise p-p <sup>(Note 1)</sup>	Initial Setting Accuracy <sup>(Note 2)</sup>
<b>+24V</b>	0 A	4.17 A	4.8 A	±1%	±1%	±1%	±1%
<b>+5Vsb</b> <sup>(Note 4.)</sup>	0 A	-	0.5 A	±1%	±1%	±1%	±2.5%

**Total Output Power:** Max. 100W convection cooled, max. 115W with 7 CFM at 50°C; max. 100W with 7 CFM at 70°C environment temperature <sup>(Note 3)</sup>.

Note: 1) Measured by a 20MHz bandwidth limited oscilloscope and the each output is connected with a 10µF Electrolytic Capacitor and a 0.1µF Ceramic Capacitor.

2) Initial Setting Accuracy is at Input 115VAC and all output at 60% rated load.

3) Please see the detail for the performance curves in paragraph 6.

4) See the detail model no. coding in paragraph 5.

5) Please see the definition in paragraph 3.

6) MAX output current can be sustained if the total power doesn't exceed 100W

## 2. Input Specification

Parameter	Conditions/Description	Min.	Nom.	Max.	Units
Input Voltage	Continuous input range.	85	115 / 230	264	VAC
Input Frequency	AC input.	47	50 / 60	63	Hz
Hold Up Time	Nominal AC Input Voltage (115/230VAC), rated load.	10 / 40			ms
Input Current	Nominal AC Input Voltage (115VAC), rated load.			2.5	A
Inrush Current	Nominal AC Input Voltage (115/230VAC), one cycle at 25°C cold start.			30 / 60	A
Input Protect	Non-user serviceable internally located AC input line fuse.				
No-load power consumption	Nominal AC Input Voltage (115/230VAC)			<0.5	W

### 3. Output Specification

Parameter	Conditions/Description	Min.	Nom.	Max.	Units
Efficiency	At input 230VAC, rated load <sup>(Note 1)</sup> .	88	90		%
Minimum load		See Chart of Description			
Ripple & Noise	Rated load, 20MHz bandwidth	See Chart of Description			
Output Power	Continuous output power	See Chart of Description			
Line Regulation	Less than $\pm 1\%$ at rated load with $\pm 10\%$ changing in input voltage 115VAC.	See Chart of Description			
Load Regulation	Measured from 60% to 100% rated load and from 60% to 20% rated load (60% $\pm 40\%$ rated load).	See Chart of Description			
Turn-on Delay	Time required for initial output voltage stabilization		0.45		Sec
Leakage Current	At input 264VAC, 63Hz, rated load			0.25	mA

Note: 1) It shall be warmed up above 1 hr.

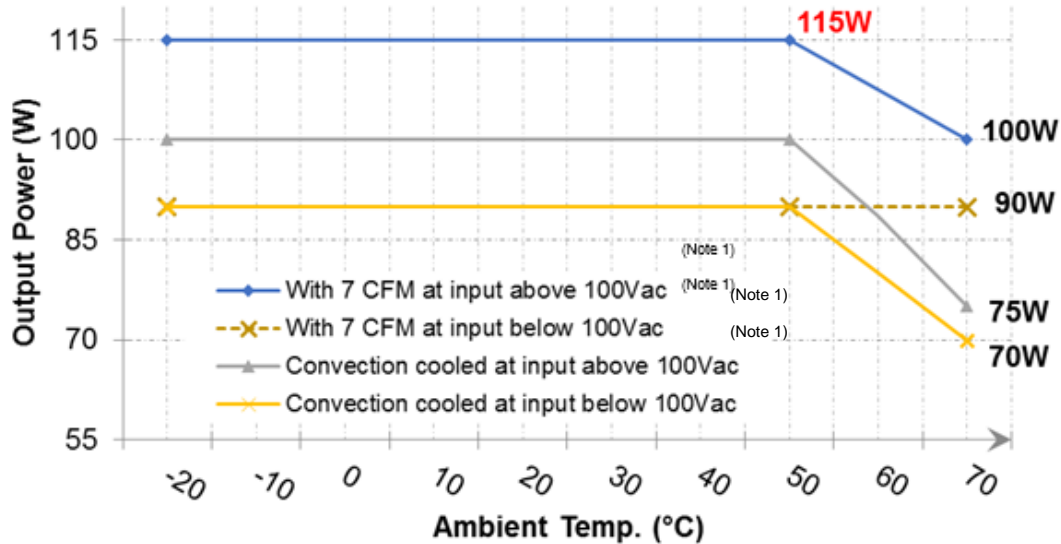
### 4. Interface Signals and Internal Protection

Parameter	Conditions/Description
Short Circuit Protection	Fully protected against output overload and short circuit. Automatic recovery upon of overload condition.
Over Voltage Protection	For some reason the power supply fails to control itself, the build-in over voltage protection circuit will auto recovery the outputs to prevent damaging external circuits, the trigger point is around 110%~135% of output voltage.
Remote on/off (optional)	The power supply will be turned on when the power On/Off pin is connected to secondary GND. This function exists only with optional +5Vsb.

### 5. Environment Specification

Parameter	Conditions/Description	Min.	Nom.	Max.	Units
Operating Temperature	See the following performance curves for the detail.	-20		+70	$^{\circ}\text{C}$
Storage Temperature		-40		+85	$^{\circ}\text{C}$
Relative Humidity	Non-condensing.	5		95	%RH
Altitude	Operating Non-operating			3K 4K	Meter

## Performance curve



Note: 1) Air flow from IC3 to the body of PSU with distance 50mm maximum.

## 6. Safety Approvals, EMI and EMS Specification

Parameter	Conditions/Description	Min.	Nom.	Max.	Units
Approvals	IEC 60950-1, 2 <sup>nd</sup> edition	CE (LVD) declaration			
	EN 60950-1, 2 <sup>nd</sup> edition				
	UL 60950-1, 2nd Edition	UL, cUL approved			
	CSA C22.2 No. 60950-1-07, 2nd Edition				
Hi-Pot	Input to Output	3000			VAC
	Input to Ground	1500			
EMI (Note 1, 3)	EN 55022 / CISPR 22 & FCC Part 15	B			Class
	EN 61000-3-2	A			
	EN 61000-3-3				
	EN 61204-3	B			
EMS (Note 1.)	IEC 61000-4-2 ±8KV air discharge, ±6KV contact discharge	A			Criteria
	IEC 61000-4-3 10V/m	A			
	IEC 61000-4-4 ±2KV Line & PE	A			
	IEC 61000-4-5 L-N:±1KV, L/N-PE:±2KV	A			
	IEC 61000-4-6 10Vrms	A			
	IEC 61000-4-8 10A/m	A			
	IEC 61000-4-11 Voltage dips >95%, 0.5 cycle	A			
	Voltage dips 30%, 25 cycles	A			
Voltage dips 60%, 5 cycles	A / B				
	(Note 2.)				
	Voltage interruptions >95%, 250 cycles	C			

Note: 1) As a build-in type power supply, the power supply needs to be installed in a suitable enclosure to pass the EMI/EMC

tests. The final assembly has to comply with the valid EMI/EMC and safety.

2) The test result of input 240Vac / 100Vac is criteria A / B.

3) The mounting holes should be connected to each other to conform the EMI limit.

## 7. Mechanical Specification

### Parameter Conditions/Description

Dimension 101.6 (L) x 50.8 (W) x 34.2 (H) mm, Tolerance +/- 0.4mm.

Connector & Pin Assignment	Location	Pin (Note 1)	Assignment	Proposed Housing	Proposed Terminals
CN1 (Input)	MX1	JT2	AC in (N)	a. MOLEX: 09-50-1031 (5195-03) or 09-52-4034 (5239-03) or equivalent	a. MOLEX :5194 or 5225 2478, 2578,5167 or 5168; or equivalent
		JT1	AC in (L)	b. JST: VHR-3N or equivalent (Note 2)	b. JST: SVH-21T-P1.1 or equivalent
CN2 (Output)	MX1	JT4	0 V	a. MOLEX : 09-50-1041 (5195-04) or 09-52-4044 (5239-04) or equivalent b. JST: VHR-4N or equivalent (Note 2)	a. MOLEX::5194 or 5225 2478, 2578,5167 or 5168; or equivalent b. JST: SVH-21T-P1.1 or equivalent
		JT3	0 V		
		JT2	+ V		
		JT1	+ V		
CN3 (Note 3)	MX1	JT3	+5Vsb	a. MOLEX: 22-01-1032 (5051-03) or 51191-0300 or equivalent b. JST: XHP-3 or equivalent (Note 2)	a. MOLEX :2759 or 5159 or 50802 or equivalent b. JST: SXH-001T-P0.6N, SXH-001T-P0.6 or SXH-002T-P0.6 or equivalent
		JT2	0 V		
		JT1	RC		

Note: 1) The pin assignment "MX" for Molex type connector or equivalent, "JT" for JST type connector.

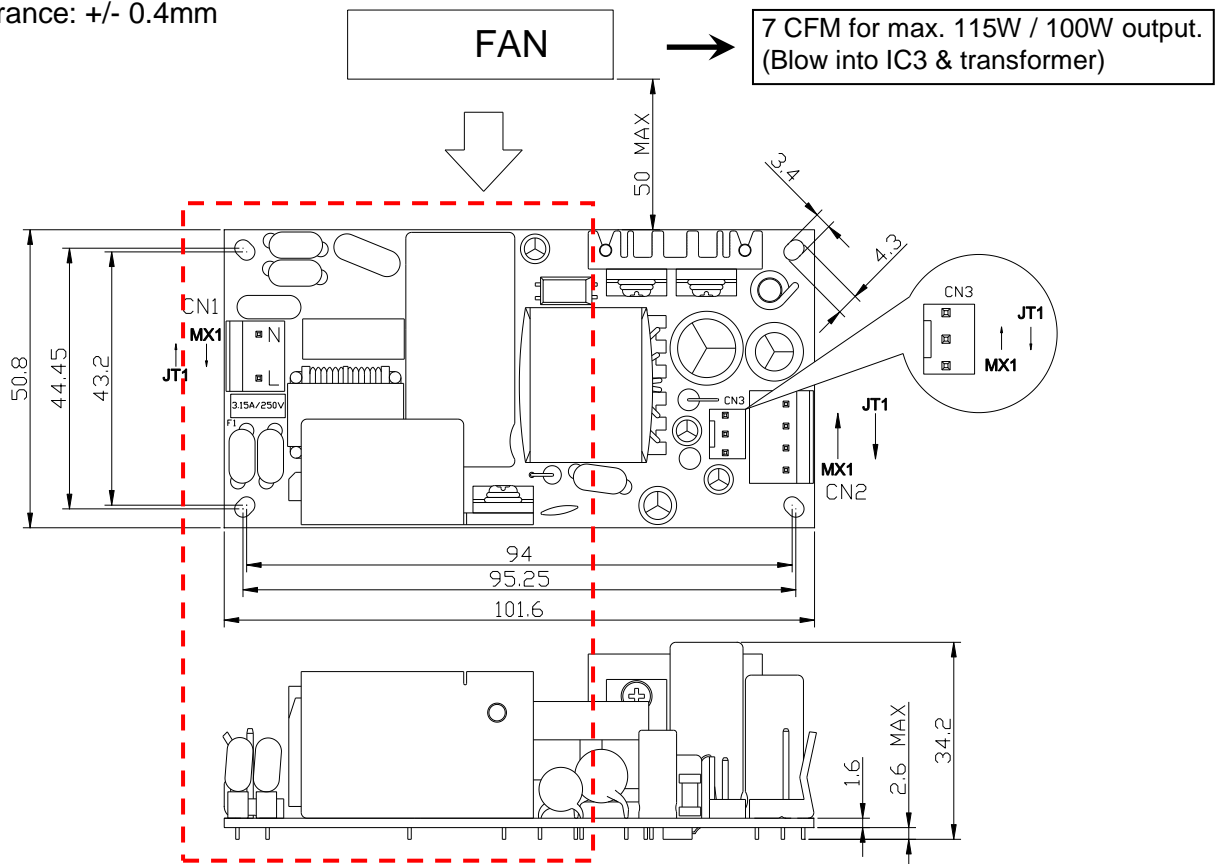
2) Exist with model no. suffixed -J, please see the comparison in paragraph 5.

3) Exist with model no. suffixed -SB, please see the comparison in paragraph 5.

### Mechanical drawing (M/N: INR ES 105)

Unit: mm

Tolerance: +/- 0.4mm



#### \*Application note:

The installation shall be kept in an isolation distance min. 2.8mm between the unit and the system chassis. There exist hazardous voltage in dotted area, keep insulating to avoid hazardous electric shock.

**SPECIFICATION**

For

**SWITCHING POWER SUPPLY**

INR ES 105

## Revision history

REV.	Jul. 5 <sup>th</sup> 2011	Established.
REV.	Aug. 18 <sup>th</sup> 2011	Updated the performance.
REV.	Sep. 8 <sup>th</sup> 2011	Added the performance curves.
REV.	Dec. 6 <sup>th</sup> 2011	Updated the performance.
REV.	Jan. 13 <sup>th</sup> 2012	Added the dimensions of mounting holes.
REV.	Feb. 17 <sup>th</sup> 2012	Updated the features.
REV.	Apr. 6 <sup>th</sup> 2012	Revised the dimensions of mounting holes.
REV.	Jan. 3 <sup>rd</sup> 2013	Supplemented the description of pin assignment.
REV.	May 21 <sup>st</sup> 2015	Changed the initial setting accuracy of +5Vsb from $\pm 1.5\%$ to $\pm 2.5\%$
REV.	Nov. 5 <sup>th</sup> 2015	1.Changed Molex Proposed Terminals from 5176 to 5167. 2.Added "or equivalent" after "Molex" and "JST".
REV.	Jan. 19 <sup>th</sup> 2016	1.Changed +5Vsb Rated Output Current 0.1A to "-", Max Output Current 0.1A to 0.5A 2.Added note 6 at Description.



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