

WRA960 SERIES

3PH AC - DC DIN RAIL MOUNTABLE POWER SUPPLY
INDUSTRIAL CONTROL EQUIPMENT



FEATURES

- 3 PHASE AC INPUT VOLTAGE
- COMPACT DESIGN
- PARALLEL FUNCTION
- UNIVERSAL INPUT VOLTAGE
- 3 YEARS WARRANTY



SELECTION CHART WRA 960 - 24

Wattage 24 : 24V OUT 48 : 48V OUT

MODEL LIST

MODEL NO.	INPUT VOLTAGE	OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (typ.)
Single Output Models						
WRA960-24	3 ϕ 340~575 VAC	960 WATTS	+ 24 VDC	40 A	90%	92%
WRA960-24L	3 ϕ 340~575 VAC	960 WATTS	+ 24 VDC	40 A	90%	92%
WRA960-48	3 ϕ 340~575 VAC	960 WATTS	+ 48 VDC	20 A	91%	93%

SPECIFICATION

All Specifications Typical At Nominal Line, Full Load, 25°C Unless Otherwise Noticed

GENERAL						
Characteristics	Conditions	min.	typ.	max.	unit	
Switching frequency	Vi nom, Io nom		52		KHz	
Isolation voltage	Input-Output	3,000 / 4,242			VAC / VDC	
	Input-FG	1,500 / 2,121			VAC / VDC	
	Output-FG	500 / 710			VAC / VDC	
Isolation resistance	Input-Output, @ 500VDC	100			M Ω	
Ambient temperature	Operating at Vi nom	-40		+ 71	°C	
Derating (see derating curve)	Vi nom, from +61 to +71°C			3.5	% / °C	
Storage temperature	Non operational	-40		+ 85	°C	
Relative humidity	Vi nom, Io nom	20		95	% RH	
Temperature coefficient	Vi nom, Io min			± 0.03	% / °C	
MTBF	Bellcore Issue 6 @40°C, GB	24V		352,000	Hours	
		24L		381,000	Hours	
		48V		390,000	Hours	
Altitude during operation	IEC 60068-2-13			4,850	m	
Dimension	Screw terminal type	L126.2 x W275.8 x DI 18.8			mm	
Cooling	Free air convection					
Installation position	Vertical (other direction may derating using)					
Pollution degree		2				

INPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit		
Nominal voltage *I		I ϕ or 3 ϕ 380 / 480 VAC					
Rated input voltage	Io nom	400		500	VAC		
Absolute input max. range	Ta min ... Ta max, Io nom	AC in	340		575	VAC	
		DC in	480		820	VDC	
Input current	Vi : 400 / 500 VAC, Io nom		1.72 / 1.5		A		
Rated input current	Vi : 340 VAC, Io nom			2.4	A		

*I. Single phase input is permissible, but output load is derated to 75%
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ISO 9001 Certified

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SPECIFICATION

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INPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Line frequency	Vi nom, lo nom	47		63	Hz
Inrush current	Vi nom, lo nom		30	35	A
	cold start	24V, 48V			
Power dissipation	Vi : 400 VAC, lo nom	24L	50	60	A
		24V	98		W
Leakage current	Input-Output	48V	90		W
		Input-FG		0.25	3.5
P.F.C. (Passive)	Vi nom, lo nom		0.8		

OUTPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Output voltage accuracy (Adjusted before shipment)	Vi nom, lo max	0		+ 1	%
Minimum load	Vi nom	0			%
Line regulation	lo nom, Vi min ...Vi max			± 1	%
Load regulation	Vi nom, lo min ...lo nom	single mode		± 1	%
		parallel mode		± 5	%
Voltage trim range	Vi nom, 0.8 lo nom	24V	22.5	28.5	VDC
		48V	47	56	VDC
Rated continuous loading	Vi nom	24V	40 A @ 24Vdc / 33.5 A @ 28.5Vdc		
		48V	20 A @ 48Vdc / 17 A @ 56Vdc		
Hold up time	Vi nom , lo nom	15			ms
Turn on time	Vi nom, lo nom			1,000	ms
	Vi nom, lo nom → with 7000 μF CAP			1,500	ms
Rise time	Vi nom, lo nom			150	ms
	Vi nom, lo nom → with 7000 μF CAP			500	ms
Fall time	Vi nom, lo nom			150	ms
Transient recovery time	Vi nom, I ~ 0.5 lo nom			2	ms
Ripple & noise	Vi nom, lo nom, BW = 20MHz			80	mV
Power back immunity	Vi nom, lo nom	24V	35		VDC
		48V	63		VDC
Capacitor load	Vi nom, lo nom			7,000	μF
DC ON indicator threshold at start up (Green LED)	Vi nom, lo nom	24V	17.6	19.4	VDC
		48V	37	43	VDC
DC LOW indicator threshold after start up (Red LED)	Vi nom, lo nom	24V	17.6	19.4	VDC
		48V	37	43	VDC
Parallel operation *2	0.1 lo min ~ 0.9 lo max			3	unit
Efficiency	Vi nom, lo nom, Po / Pi	Up to 93%, See model list and typ efficiency curve			

CONTROL AND PROTECTION

Characteristics	Conditions	min.	typ.	max.	unit
Input fuse		T5 A / 500 VAC internal / phase			
Internal surge voltage protection	IEC 61000-4-5	Varistor			
Rated over load protection	Vi nom(see typ current limited curve)	110		135	%
Power Rdy *2 (for WRA960-24 model only)	Threshold voltage of contact closed(at start up)	17.6		19.4	VDC
	Electrical isolation	500			VDC
	Contact rating at 60VDC			0.3	A
Over voltage protection	Vi nom, 0.8 lo nom	24V	30	33	VDC
	(Auto Recovery)	48V	60	66	VDC
Output short circuit		Hiccup mode			
Over temperature	Detect on heat sink, shut down O/P voltage, recovers automatically after temperature goes down.	100		110	°C
Degree of protection		IP20			

*2. This function is not on 24L model.

SPECIFICATION

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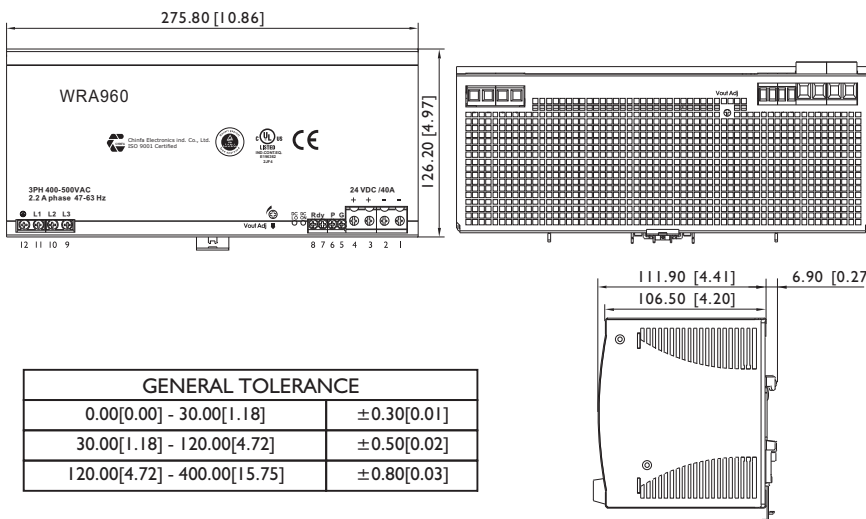
APPROVALS AND STANDARDS	
UL / cUL	UL 508 Listed UL 60950-1 Recognized ISA 12.12.01(Class I, Division 2, Groups A, B, C and D)
TUV	EN 60950-1 EN 61558-1, EN 61558-2-16 (meet EN 60204-1)
CE	EN 61000-6-3, EN 55022 Class B, EN 61000-3-2, EN 61000-3-3 EN 61000-6-2, EN 55024, EN 61000-4-2 Level 4, EN 61000-4-3 Level 3 EN 61000-4-4 Level 4, EN 61000-4-5 L-N Level 3, L / N-FG Level 4 EN 61000-4-6 Level 3, EN 61000-4-8 Level 4, EN 61000-4-11 ENV 50204 Level 2, EN 61204-3
CQC	GB4943.1, GB9254, GB17625.1
Vibration resistance	meet IEC 60068-2-6 (Mounting by rail : 10-500 Hz, 2G, along X, Y, Z each Axis, 60 min for each Axis)
Shock resistance	meet IEC 60068-2-27 (15G, 11ms, 3 Axis, 6 Faces, 3 times for each Face)

PHYSICAL CHARACTERISTICS

Case size	Screw terminal type 126.2 x 275.8 x 118.8 mm (4.97 x 10.86 x 4.68 inches)
Case material	Metal
Weight	3400g
Packing	3.68kg ; 6 pcs / 23kg / 2.41CUFT

MECHANISM & PIN CONFIGURATION

mm [inch]



GENERAL TOLERANCE	
0.00[0.00] - 30.00[1.18]	±0.30[0.01]
30.00[1.18] - 120.00[4.72]	±0.50[0.02]
120.00[4.72] - 400.00[15.75]	±0.80[0.03]

CONSTRUCTION

Easy snap-on mounting onto the DIN-Rail (TS35/7.5 or TS35/15), unit sits safely and firmly on the rail.

INSTALLATION

Ventilation / Cooling

Normal convection

All sides 25mm free space

For cooling recommended

Connector size range

Input and Rdy, P, G Control : AWG24 - 10

(0.2~4mm²), flexible / solid cable

Output : AWG20 - 6

(0.5~10mm²), flexible / solid cable

- Input connector can withstand torque at maximum 9 pound-inches

Rdy, P, G control connector can withstand torque at maximum 5.5 pound-inches

8m/m stripping at cable end recommends

- Output connector can withstand torque at maximum 15.6 pound-inches

10m/m stripping at cable end recommends

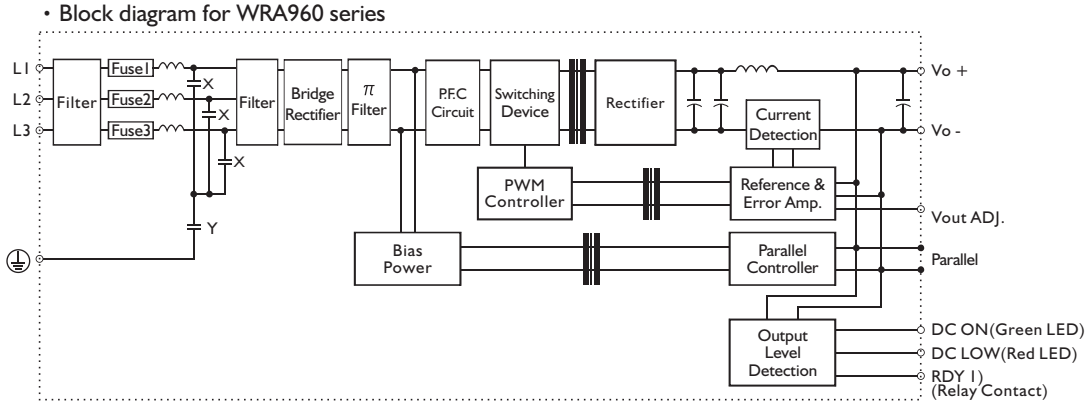
Use copper conductors only, 60 / 75°C

PIN ASSIGNMENT

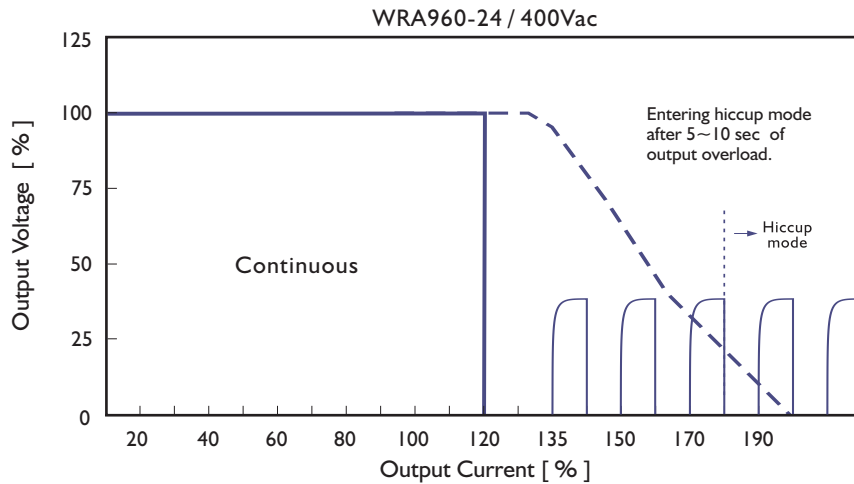
PIN NO.	Designation	Description
1, 2	V -	Negative output terminal
3, 4	V +	Positive output terminal
5	G	Parallel GND PIN for current share
6	P	Parallel PIN for current share
7	RDY	A normal open relay contact for DC ON level control
8		(Never connect except 24V model)
9	L3	Input terminals
10	L2	Input terminals
11	L1	Input terminals
12	⊕	Ground this terminal to minimize high-frequency emissions
	DC ON	Operation indicator LED
	DC LO	DC LOW voltage indicator LED
	Vout ADJ.	Trimmer-potentiometer for Vout adjustment

* WRA960-24L without PIN5~ PIN8

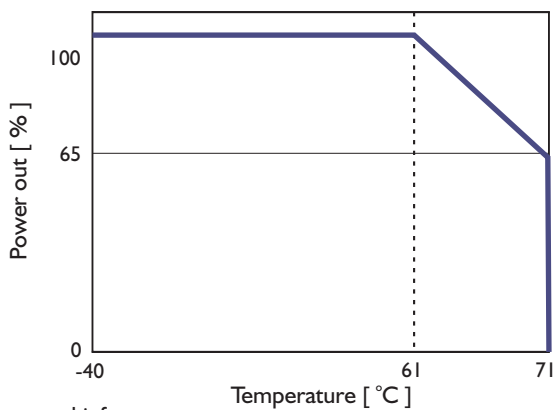
CIRCUIT SCHEMATIC



TYP. CURRENT LIMITED CURVE



DERATING CURVE



TYP. EFFICIENCY CURVE

