

WRAI20 SERIES



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

FEATURES

- 3 PHASE AC INPUT VOLTAGE
- SELV COMPONENTS DESIGN
- SHORT CIRCUIT PROTECTION
- INTERNAL INPUT FILTER
- OVER TEMPERATURE PROTECTION
- 3 YEARS WARRANTY



SELECTION CHART

WRAI20 - 24

Wattage ☐ 12 : 12V OUT 24 : 24V OUT

MODEL LIST

MODEL NO.	INPUT VOLTAGE	OUTPUT WATTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT	EFF. (min.)	EFF. (typ.)
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Single Output Models

WRAI20-12	3 ϕ 340~575 VAC	120 WATTS	+ 12 VDC	10 A	85%	87%
WRAI20-24	3 ϕ 340~575 VAC	120 WATTS	+ 24 VDC	5 A	87%	89%

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		70		KHz
Isolation voltage	Input-Output	4,243 / 6,000			VAC / VDC
	Input-PE	2,828 / 4,000			VAC / VDC
	Output-PE	500 / 710			VAC / VDC
	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			2.5	% / °C
Storage temperature	Non operational	-40		+ 85	°C
Relative humidity	Vi nom, Io nom	20		95	% RH
Temperature coefficient	Vi nom, Io min			$\pm$ 0.03	% / °C
MTBF	Bellcore Issue 6 @40°C, GB	12V	569,000		Hours
		24V	572,000		Hours
Altitude during operation	EN 62368-1			5,000	m
Dimension	Screw terminal type	L124 x W74.3 x D118.8			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 *1		1 ϕ or 3 ϕ 380 / 480 VAC			
Rated input voltage	Io nom	400		500	VAC
Absolute input max. range	Ta min ... Ta max,	340		575	VAC
	Io nom	480		820	VDC
Input current	Vi : 400 / 500 VAC, Io nom		0.36 / 0.3		A
Rated input current	Vi : 340 VAC, Io nom			0.5	A
Line frequency	Vi nom, Io nom	47		63	Hz

*1. Single phase input is permissible, but output load is derated to 75%



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INPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Inrush current	Vi nom, Io nom		10	12	A
Power dissipation	Vi : 400 VAC, Io nom		20		W
	12V		16		W
Leakage current	Input-Output			0.25	mA
	Input-PE			3.5	mA
Power factor (Passive)	Vi nom, Io nom		0.55		

OUTPUT SPECIFICATIONS

Characteristics	Conditions	min.	typ.	max.	unit
Output voltage accuracy (Adjusted before shipment)	Vi nom, Io max	0		+ 1	%
Minimum load	Vi nom	0			%
Line regulation	Io nom, Vi min ...Vi max			± 1	%
Load regulation	Vi nom, Io min ...Io nom			± 1	%
Voltage trim range	Vi nom, 0.8 Io nom	11.4		14.5	VDC
	12V	22.5		28.5	VDC
Rated continuous loading	Vi nom		10 A @ 12Vdc / 8.2 A @ 14.5Vdc		
	12V		5 A @ 24Vdc / 4.2 A @ 28.5Vdc		
Hold up time	Vi nom, Io nom	20			ms
Turn on time	Vi nom, Io nom			1,000	ms
	Vi nom, Io nom → 12V model : with 7000 μ F CAP			1,500	ms
Rise time	Vi nom, Io nom			150	ms
	Vi nom, Io nom → 12V model : with 7000 μ F CAP			500	ms
Fall time	Vi nom, Io nom			150	ms
	Vi nom, Io nom → 12V model : with 7000 μ F CAP			500	ms
Transient recovery time	Vi nom, I ~0.5 Io nom			2	ms
Ripple & noise	Vi nom, Io nom, BW = 20MHz			100	mV
Power back immunity	Vi nom, Io nom	18			VDC
	12V	35			VDC
Capacitor load	Vi nom, Io nom			7,000	μ F
	12V			3,500	μ F
DC ON indicator threshold at start up (Green LED)	Vi nom, Io nom	10		11.2	VDC
	12V	17.6		19.4	VDC
DC LOW indicator threshold after start up (Red LED)	Vi nom, Io nom	10		11.2	VDC
	12V	17.6		19.4	VDC
Efficiency	Vi nom, Io nom, Po / Pi	Up to 89%, See model list and typ efficiency curve			

CONTROL AND PROTECTION

Characteristics	Conditions	min.	typ.	max.	unit
Input fuse		2 A / 600 VAC internal / phase			
Internal surge voltage protection	IEC 61000-4-5	Varistor			
Rated over load protection	Vi nom (see typ current limited curve)	115		135	%
Power Rdy (for 24V 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 Io nom	15		16.5	VDC
	(Auto Recovery)	30		33	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			

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APPROVALS AND STANDARDS

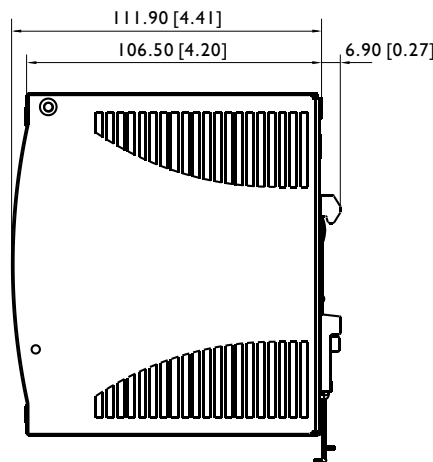
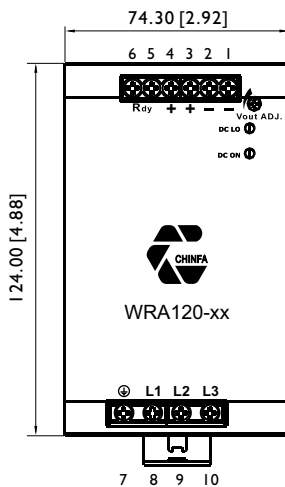
UL / cUL	UL 508 Listed UL 60950-1 Recognized ISA 12.12.01(Class I, Division 2, Groups A, B, C and D)
TUV	BS EN / EN 62368-1, EN 61558-1, EN 61558-2-16 (meet EN 60204-1)
cTUVus	UL 62368-1
CE	BS EN / EN 61000-6-3, BS EN / EN 55032 Class B, BS EN / EN 61000-3-2, BS EN / EN 61000-3-3 BS EN / EN 61000-6-2, BS EN / EN 55035, BS EN / EN 61000-4-2 Level 4, BS EN / EN 61000-4-3 Level 3 BS EN / EN 61000-4-4 Level 4, BS EN / EN 61000-4-5 Level 4 BS EN / EN 61000-4-6 Level 3, BS EN / EN 61000-4-8 Level 4, BS EN / EN 61000-4-11 BS EN / EN 61204-3, CISPR 32
CQC	GB4943.1, GB/T 9254.1, GB17625.1
Vibration resistance	meet IEC 60068-2-6 (Mounting on 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 124 x 74.3 x 118.8 mm (4.88 x 2.92 x 4.68 inches)
Case material	Metal
Weight	800g
Packing	0.92kg ; 20 pcs / 19.5kg / 2.02CUFT

MECHANISM & PIN CONFIGURATION

mm [inch]



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
AWG24-10 (0.2~4mm²) flexible / solid cable,
-Input connector can withstand torque at maximum 9 pound-inches.
-Output connector can withstand torque at maximum 5.5 pound-inches.
8 m/m stripping at cable end recommends
Use copper conductors only, 60 / 75°C

GENERAL TOLERANCE

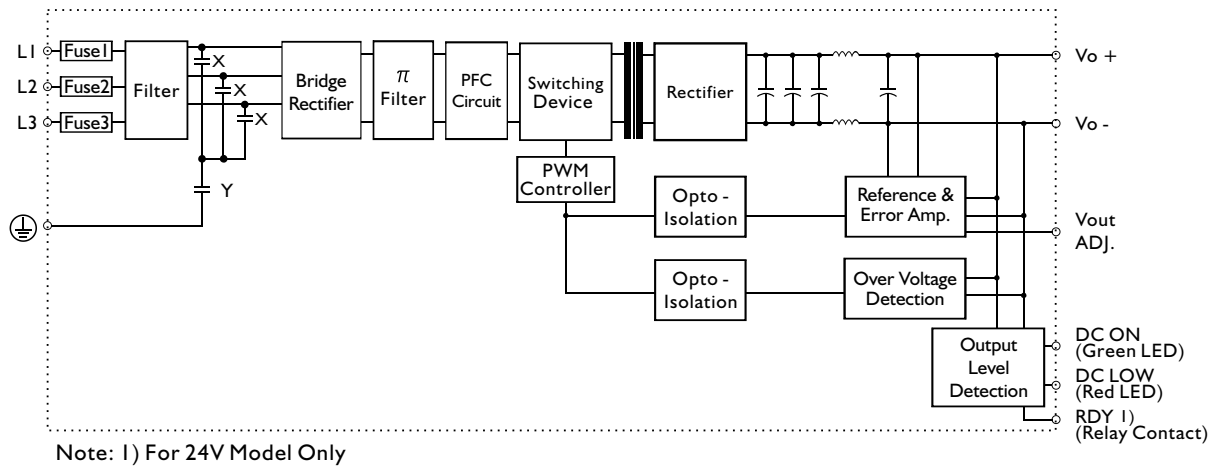
0.00[0.00] - 30.00[1.18]	±0.30[0.01]
30.00[1.18] - 120.00[4.72]	±0.50[0.02]
120.00[4.72] - 400.00[15.75]	±0.80[0.03]

PIN ASSIGNMENT

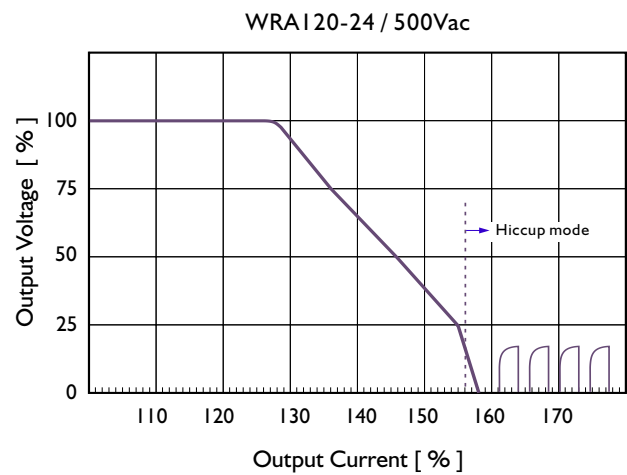
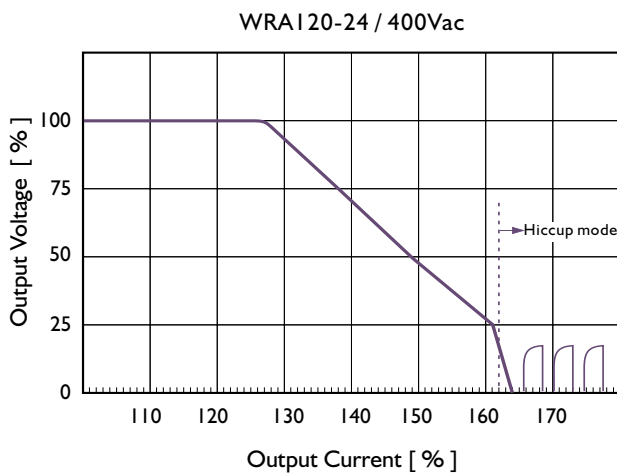
PIN NO.	Designation		Description
1, 2	OUT	V -	Negative output terminal
3, 4		V +	Positive output terminal
5		RDY	A normal open circuit of PhotoMOS Relay (24V model only)
6			
7	IN	⊕	Ground this terminal to minimize high-frequency emissions
8		L1	Input terminals
9		L2	Input terminals
10		L3	Input terminals
	OTHER	DC ON	Operation indicator LED
		DC LO	DC LOW voltage indicator LED
		Vout ADJ.	Trimmer-potentiometer for Vout adjustment

CIRCUIT SCHEMATIC

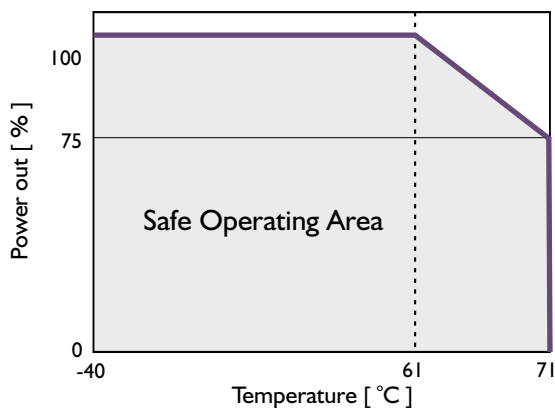
• Block diagram for WRA120 series



TYP. CURRENT LIMITED CURVE



DERATING CURVE



TYP. EFFICIENCY CURVE

