

VRH 100 SERIES



2PH / Single PH AC - DC DIN RAIL MOUNTABLE
POWER SUPPLY
INDUSTRIAL CONTROL EQUIPMENT

FEATURES

- 2 PHASE / Single PHASE HIGH AC INPUT VOLTAGE
- SHORT CIRCUIT PROTECTION
- INTERNAL INPUT FILTER
- 3 YEARS WARRANTY



SELECTION CHART

VRH 100 - 24

Wattage

12 : 12V OUT
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						
VRH100-12	2 ϕ /1 ϕ 340~575VAC	100 WATTS	+ 12 VDC	8.4 A	84%	86%
VRH100-24	2 ϕ /1 ϕ 340~575VAC	100 WATTS	+ 24 VDC	4.2 A	85%	87%
VRH100-48	2 ϕ /1 ϕ 340~575VAC	100 WATTS	+ 48 VDC	2.1 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			85		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
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				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				± 0.03	% / °C
MTBF	Bellcore Issue 6 @40°C, GB	12V		614,000		Hours
		24V		657,000		Hours
		48V		660,000		Hours
Altitude during operation	EN 62368-1				5,000	m
Dimension	Screw terminal type		L90 x W54 x D114			mm
Cooling	Free air convection					
Installation position	Vertical (other direction may derating using)					
Pollution degree			2			

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INPUT SPECIFICATIONS

Characteristics	Conditions		min.	typ.	max.	unit
Nominal voltage			1 ϕ or 2 ϕ 380 / 480VAC			
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			0.48 / 0.41		A
Rated input current	Vi : 340 VAC, Io nom				0.75	A
Line frequency	Vi nom, Io nom		47		63	Hz
Inrush current	Vi nom, Io nom			10	12	A
Power dissipation	Vi : 400 VAC, Io nom	12V		15		W
		24V		13.5		W
		48V		10.5		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				$\pm$ 1	%
Load regulation	Vi nom, Io min ... Io nom	single mode			$\pm$ 1	%
		parallel mode			$\pm$ 5	%
Voltage trim range	Vi nom, 0.8 Io nom	12V	11.4		14.5	VDC
		24V	22.5		28.5	VDC
		48V	47		56	VDC
Rated continuous loading	Vi nom	12V	8.4 A @ 12Vdc / 6.9 A @ 14.5 Vdc			
		24V	4.2 A @ 24Vdc / 3.5 A @ 28.5 Vdc			
		48V	2.1 A @ 48Vdc / 1.8 A @ 56 Vdc			
Hold up time	Vi nom, Io max		20			ms
Turn on time	Vi nom, Io nom				1,000	ms
	Vi nom, Io nom $\rightarrow$ 12V, 24V models : with 7000 μ F CAP 48V model : with 3500 μ F CAP				1,500	ms
Rise time	Vi nom, Io nom				150	ms
	Vi nom, Io nom $\rightarrow$ 12V, 24V models : with 7000 μ F CAP 48V model : with 3500 μ F CAP				500	ms
Fall time	Vi nom, Io nom				150	ms
Transient recovery time	Vi nom, I ~ 0.5 Io nom				2	ms
Ripple & noise	Vi nom, Io nom, BW = 20MHz				50	mV
Power back immunity	Vi nom, Io nom	12V model	18			VDC
		24V model	35			VDC
		48V model	63			VDC
Capacitor load	Vi nom, Io nom	12V, 24V models			7,000	μ F
		48V model			3,500	μ F
DC ON indicator threshold at start up (Green LED)	Vi nom, Io nom	12V model	10		11.2	VDC
		24V model	17.6		19.4	VDC
		48V model	37		43	VDC
DC LOW indicator threshold after start up (Red LED)	Vi nom, Io nom	12V model	10		11.2	VDC
		24V model	17.6		19.4	VDC
		48V model	37		43	VDC
Parallel operation	0.1 Io min ~ 0.9 Io max				2	unit
Efficiency	Vi nom, Io nom, Po / Pi		Up to 89%, See model list and typ efficiency curve			

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CONTROL AND PROTECTION					
Characteristics	Conditions	min.	typ.	max.	unit
Input fuse		2A / 600VAC internal			
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 (Auto Recovery)	12V	15	16.5	VDC
		24V	30	33	VDC
		48V	60	66	VDC
Output short circuit		Hiccup mode			
Degree of protection		IP20			

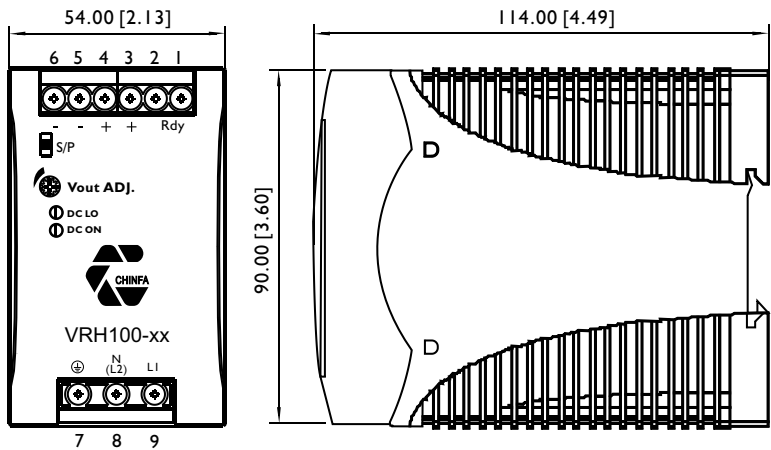
APPROVALS AND STANDARDS	
UL / cUL	UL 508 Listed UL 60950-1 Recognized ISA 12.12.01 (Class I, Division 2, Groups A, B, C and D)
TUV	BS EN / EN 62368-1, EN 61558-1, EN 61558-2-16 (meet EN 60204-1)
cTUVus	UL 62368-1
CE	BS EN / EN 61000-6-3, BS EN / EN 55032 Class B, BS EN / EN 61000-3-2, BS EN / EN 61000-3-3 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
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	90 x 54 x 114 mm (3.6 x 2.13 x 4.49 inches)
Case material	Plastic
Weight	500g
Packing	0.57kg ; 32pcs / 19.5kg / 1.85CUFT

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

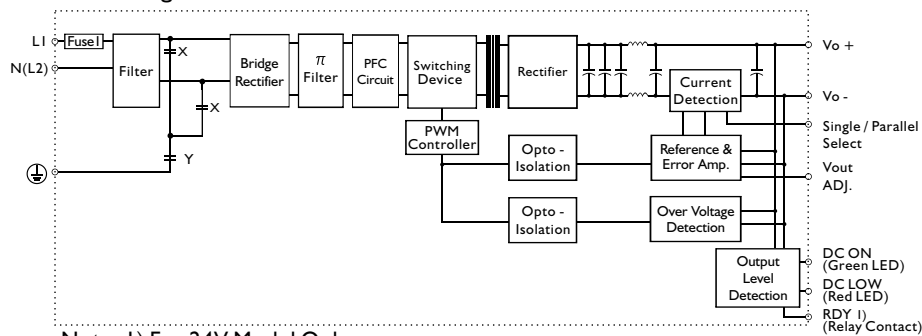
GENERAL TOLERANCE	
0.00[0.00] - 30.00[1.18]	±0.30[0.01]
30.00[1.18] - 120.00[4.72]	±0.50[0.02]

PIN ASSIGNMENT

PIN NO.	Designation		Description
1	OUT	RDY	A normal open circuit of PhotoMOS Relay (24V model only)
2		V +	Positive output terminal
3, 4		V -	Negative output terminal
5, 6		⊥	Ground this terminal to minimize high-frequency emissions
7	IN	N (L2)	Input terminals (phase conductor, no polarity at DC input)
8		LI	Input terminals (neutral conductor, no polarity at DC input)
9	OTHER	DC ON	Operation indicator LED
		DC LO	DC LOW voltage indicator LED
		Vout ADJ.	Trimmer-potentiometer for Vout adjustment
		S / P	Single / Parallel select switch

CIRCUIT SCHEMATIC

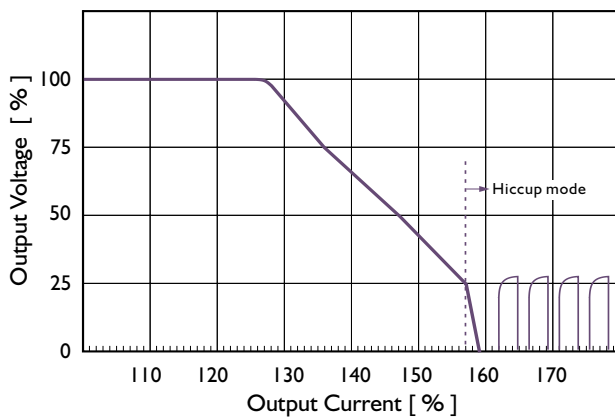
- Block diagram for VRH100 series



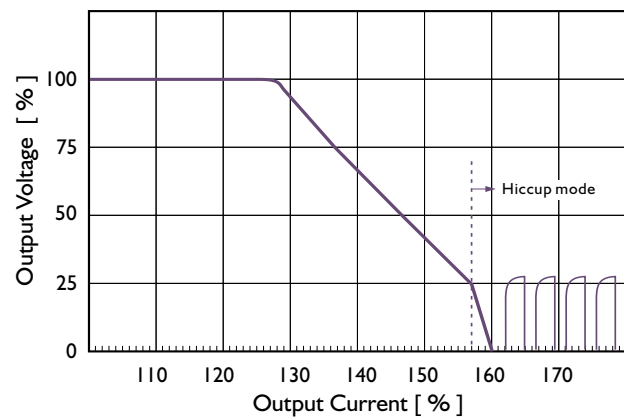
Note: 1) For 24V Model Only

TYP. CURRENT LIMITED CURVE

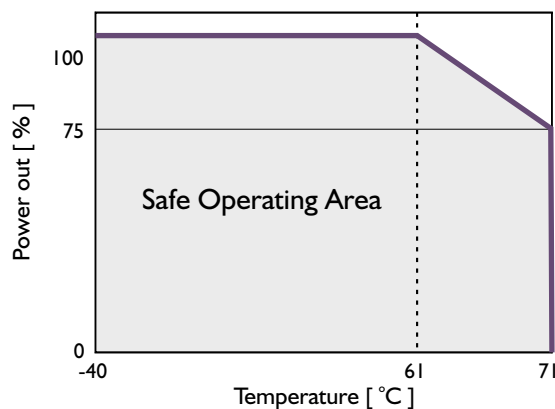
VRH100-24 / 400Vac



VRH100-24 / 500Vac



DERATING CURVE



TYP. EFFICIENCY CURVE

VRH100-24

