ARTESYN TECHNOLOGIES

WR-K SERIES

Single, dual and triple output

[2 YEAR WARRANTY]

- **Low profile – 0.91 inch high**
- **Efficiencies to 84%**
- **UL approved (Single outputs)**
- **2:1 input range**
- **PCB or chassis mounting**
- **Pi input filter**
- **OVP on all outputs**

WR-K Series devices are efficient, high power DC/DC converters with single, dual and triple outputs supplying 50 to 60 Watts. Their low profile 3.5 x 5.5 x 0.91 inch package provides a power density of 3.4 Watts per cubic inch. Efficiencies range from 78% to 84%. These converters feature unique dual power stages utilising forward converters with MOSFET switching at 100kHz. A Pi network input filter is also included. High efficiency is virtually constant down to 30% output loading. Other features include output short circuit protection, overvoltage protection, remote sensing of primary output, input surge protection and remote on/off control. The 2:1 input voltage ranges are 9 to 18VDC, 18 to 36VDC and 36 to 72VDC. Typical applications for WR-K Series power supplies include telecoms, distributed power systems and industrial automation.

SPECIFICATION

All specifications are typical at nominal input, full load at 25°C unless otherwise stated

OUTPUT SPECIFICATIONS		
Voltage accuracy		±1.0%
Voltage adjustability	Singles and duals, Note 7, 8	±10%
Remote sense	See Note 5, 6	Yes
Line regulation	HL-LL Triples, –5V output	±0.5%, max. ±1% max.
Load regulation Note 3, 11	FL-0.25%FL Dual output Triples, –5V output	±1.0% max ±2% max. ±5.0% max.
Ripple and noise	5Hz to 20MHz	75mV pk-pk 10mV rms, max.
Transient response	25% step load, change	±1.0% error band 500µs recovery max.
Temperature coefficient		±0.02%/°C, max.
Overvoltage protection	See Note 4	OVP clamp on all outputs
Short circuit protection	All outputs	Continuous automatic recovery

INPUT SPECIFICATIONS		
Input voltage range	12VDC 24VDC 48VDC	9 to 18VDC 18 to 36VDC 36 to 72VDC
No load input current	Singles, duals at 12Vin Triples at 12Vin Singles, duals at 24 and 48Vin Triples at 24 and 48Vin	25mA 70mA 20mA 45mA
Input filter		Pi network
Reverse voltage protection	Note 12	Internal shunt diode Use external fuse
Surge protection		Transient clamp

INPUT SPECIFICATIONS CONTINUED	
Remote ON/OFF Logic compatibility E_c-ON E_c-OFF Shutdown idle current Input resistance Control common	 CMOS or open collector TTL +5.5VDC min. or open-circuit max. 1.8VDC 5mA 0VDC <Ein< 9VDC; 100kΩ Referenced to input minus

GENERAL SPECIFICATIONS		
Efficiency	See table	78%, min.
Isolation voltage See Note 9	Input/output Input/case	500VDC, min. 250VDC, min.
Switching frequency	Fixed	100kHz
Approvals and standards	Safety	UL478
Case material		Black coated aluminium with non-conductive base
Weight (without heatsink)	Single/dual Triple	454g (16.03oz) 390g (13.77oz)
MTBF	See Note 10	840,000 hours

ENVIRONMENTAL SPECIFICATIONS		
Thermal performance	Operating ambient Operating with optional heatsink Operating, case Non-operating amb. Derating above +85°C case Cooling	–25°C to +55°C –25°C to +71°C -25°C to +85°C -55°C to +105°C Linearly to 0 Watts at +100°C Free-air convection cooled or conduction
Relative humidity	Non-condensing	5% to 95% RH
Altitude	Operating Non operating	10,000 feet max. 40,000 feet max.
Vibration, 5Hz to 500Hz	Pressure	2.5G rms (approx.)

50 to 60 Watt
Wide input DC/DC converters

INPUT VOLTAGE	OUTPUT VOLTAGE 1	OUTPUT VOLTAGE 2	OUTPUT VOLTAGE 3	OUTPUT POWER	INPUT CURRENT (1)	TYPICAL EFFICIENCY	CASE OPTION (2)	MODEL NUMBER
SINGLE OUTPUT								
9-18VDC	5V@10A	–	–	50W	5.3A	78%		WR12S05/50K
9-18VDC	12V@5A	–	–	60W	6.3A	80%	-1, -3	WR12S12/60K
9-18VDC	15V@4A	–		60W	6.3A	80%	-1,	WR12S15/60K
18-36VDC	5V@10A	–	–	50W	2.7A	78%	-1, -3	WR24S05/50K
18-36VDC	12V@5A	–	–	60W	3.1A	80%	-1, -3	WR24S12/60K
18-36VDC	15V@4A	–	–	60W	3A	80%	-1	WR24S15/60K
36-72VDC	5V@10A	–	–	50W	1.3A	78%	-1	WR48S05/50K
36-72VDC	12V@5A	–	–	60W	1.6A	80%	-1	WR48S12/60K
36-72VDC	15V@4A	–	–	60W	1.6A	80%	-1	WR48S15/60K
DUAL OUTPUT, Note 11								
9-18VDC	5V@5A	5V@5A	–	50W	5.2A	80%	-1	WR12D05/50K
9-18VDC	12V@2.5A	12V@2.5A	–	60W	6.1A	82%	-1	WR12D12/60K
9-18VDC	15V@2A	15V@2A	–	60W	6.1A	82%	-1	WR12D15/60K
9-18VDC	5V@5A	12V@2.5A	–	55W	5.66A	81%	-1, -3	WR12D05-12/55K
18-36VDC	12V@2.5A	12V@2.5A	–	60W	3.05A	82%	-1, -3	WR24D12/60K
18-36VDC	15V@2A	15V@2A	–	60W	3.05A	82%	-1, -3	WR24D15/60K
18-36VDC	5V@5A	12V@2.5A	–	55W	2.83A	81%	-1, -3	WR24D05-12/55K
36-72VDC	5V@5A	5V@5A	–	50W	1.27A	82%	-1	WR48D05/50K
36-72VDC	12V@2.5A	12V@2.5A	–	60W	1.49A	84%	-1	WR48D12/60K
36-72VDC	5V@5A	12V@2.50A	–	55W	1.4A	82%	-1	WR48D05-12/55K
TRIPLE OUTPUT, Note 11								
9-18VDC	+5V@5A	–12V@1.25A	+12V@1.25A	55W	5.72A	80%	-1	WR12T05-12/55K
9-18VDC	+5V@5A	–15V@1A	+15V@1A	55W	5.72A	80%	-1, -3	WR12T05-15/55K
18-36VDC	+5V@5A	–12V@1.25A	+12V@1.25A	55W	2.83A	81%	-1, -3	WR24T05-12/55K
18-36VDC	+5V@5A	–15V@1A	+15V@1A	55W	2.83A	81%	-1, -3	WR24T05-15/55K
36-72VDC	+5V@5A	–12V@1.25A	+12V@1.25A	55W	1.4A	82%	-1	WR48T05-12/55K
36-72VDC	+5V@5A	–15V@1A	+15V@1A	55W	1.4A	82%	-1	WR48T05-15/55K
36-72VDC	+12V@2.5A	–5V@0.5A	+5V@5A	57.5W	1.46A	83%	-1	WR48T12-05/55K
36-72VDC	+15V@2A	–5V@0.5A	+5V@5A	57.5W	1.46A	83%	-1	WR48T15-05/55K

Notes

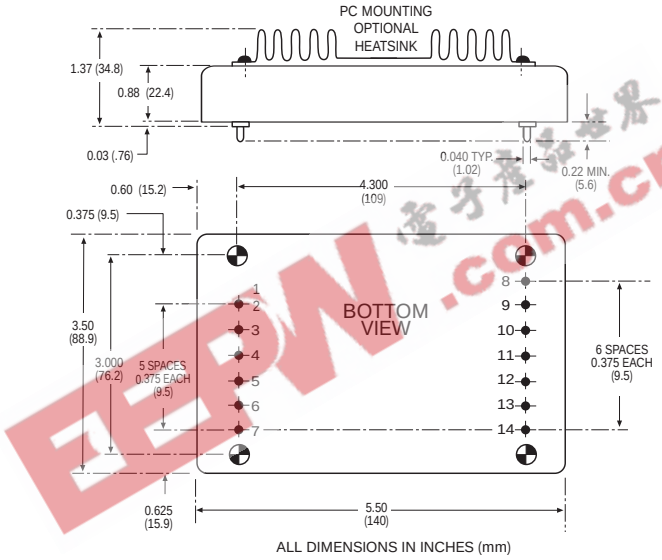
1 At nominal input voltage 12, 24 or 48VDC, full load.
2 To order the optional heatsink on the PC mount model, add the suffix '-1' to the model number **e.g. WR24D05-12/55K-1**. To order the chassis mount version with barrier terminal strip, add the suffix '-3' to the model number **e.g. WR24D05-12/55K-3**. Limit one option per unit.
3 No minimum load required for operation.
4 5V outputs clamped at 6.8V; 12V or 15V outputs clamped at 18V.
5 Can compensate for up to 1V drop between converter and load (all single-output versions, and output 1 of dual-output and triple-output versions).
6 Remote sense is provided on all singles, and output #1 of duals and triples. If remote sense is not being utilised on single output units, for normal operation pin 14 should be jumpered to pin 10 and pin 12 to pin 8. For dual output units, if remote sense is not being utilised, connect pin 11 to pin 10 and pin 8 to pin 9. Remote sense can compensate up to 1V drop between converter and load.
7 Single output models: to trim up connect pin 13 to pin 12 through a 10kΩ resistor; to trim down, connect pin 13 to pin 14 through a 10kΩ resistor.
8 Dual output models: the trim facility is provided only for output #2. To trim up connect pin 13 to pin 12 through a 10kΩ resistor; to trim down connect pin 13 to pin 14 through a 10kΩ resistor.
9 In many cases, the isolation specification may be upgraded.
10 MTBF figures are based on actual product performance.
11 The two-stage design of the WR-K Series provides isolation between outputs which means outputs can be referenced as either positive or negative. On dual output models, the outputs can be referenced as positive or negative. On triple output models. The 5V main output is isolated from the auxiliary outputs. No load sharing is possible.
12 For reverse input voltage protection, connect an external fuse in series with the input.
13 Fixed frequency design provides for easier input filtering and better noise performance.
14 Standard specifications are conservative and can be optimised for specific applications. In particular, converter start-up at lower than specified temperature, wider input voltage range, and, output voltage adjustment are all relatively simple modifications to the standard product. Consult factory for details.

International Safety Standard Approvals

UL478 File No. E131987 (48V)

50 to 60 Watt
Wide input DC/DC converters

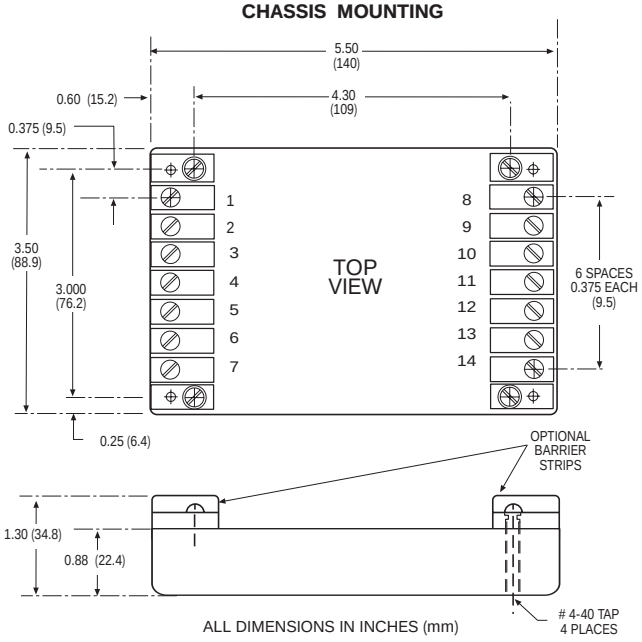
PIN CONNECTIONS (6,7,8)							
TERM	SINGLE	DUAL	TRIPLE	TERM	SINGLE	DUAL	TRIPLE
	INPUTS				OUTPUTS		
1	No Pin	No Pin	No Pin	8	– Output	– Sense 1	– Sense 1
2	– Input	– Input	– Input	9	– Output	– Output 1	– Output 1
3	– Input	– Input	– Input	10	+ Output	+ Output 1	+ Output 1
4	+ Input	+ Input	+ Input	11	+ Output	+ Sense 1	+ Sense 1
5	+ Input	+ Input	+ Input	12	– Sense	– Output 2	– Output 2
6	Control	Control	Control	13	Trim	Trim 2	Common 2 & 3
7	Case	Case	Case	14	+ Sense	+ Output 2	+ Output 3



ALL DIMENSIONS IN INCHES (mm)

CASE K3

CHASSIS MOUNTING



ALL DIMENSIONS IN INCHES (mm)