



Living Industrial Partnerships

PRODUCT SPECIFICATION

DIN Rail Single Out-put Power Supplies

650

Series



FEATURES & BENEFITS

- ▶ Universal AC Input / Full Range
- ▶ Protections: Short circuit / Overload / Over Voltage / Over temperature
- ▶ ZCS/ZVS technology to reduce power dissipation
- ▶ Cooling by free air convection
- ▶ Can be installed on DIN rail TS-35/7.5 or 15
- ▶ DC OK relay contact
- ▶ No load power consumption < 1W
- ▶ LED indicator for power on
- ▶ 100% full load burn-in-test
- ▶ 2 year warranty



SPECIFICATIONS

MODEL		650.96.01.03.01	650.96.01.04.01	650.96.01.05.01
OUTPUT	DC VOLTAGE	12V	24V	48V
	RATED CURRENT	7.5A	4A	2A
	CURRENT RANGE	0 ~ 7.5A	0 ~ 4A	0 ~ 2A
	RATED POWER	90W	96W	96W
	RIPPLE & NOISE (max.) Note.2	120mVp-p	150mVp-p	200mVp-p
	VOLTAGE ADJ. RANGE	12 ~ 15V	24 ~ 30V	48 ~ 56V
	VOLTAGE TOLERANCE Note.3	± 1.0%	± 1.0%	± 1.0%
	LINE REGULATION	± 1.0%	± 1.0%	± 1.0%
	LOAD REGULATION	± 1.0%	± 1.0%	± 1.0%
	SETUP, RISE TIME Note.5	3000ms, 50ms/220VAC 3000ms, 50ms/115VAC at full load		
HOLD UP TIME (Typ.)	50ms/220VAC 20ms/115VAC at full load			
INPUT	VOLTAGE RANGE Note.6	85 ~ 264VAC 120 ~ 370VDC		
	FREQUENCY RANGE	47 ~ 63Hz		
	POWER FACTOR (Typ.)	PF ≥ 0.95/220VAC PF ≥ 0.98/115VAC at full load		
	EFFICIENCY (Typ.)	85%	86%	88%
	AC CURRENT (Typ.)	1.3A/115VAC 0.8A/220VAC		
	INRUSH CURRENT (Typ.)	COLD START 30A/115VAC 60A/220VAC		
LEAKAGE CURRENT	<1mA / 240VAC			
PROTECTION	OVERLOAD	105 ~ 150% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed		
	OVER VOLTAGE	15.6 ~ 18V	31.2 ~ 36V	57.6 ~ 64.8V
	OVER TEMPERATURE	Shut down o/p voltage, auto-recovery or re-power on to recover		
FUNCTION	DC OK SIGNAL	Relay contact rating(max.): 30V/1A resistive		
ENVIRONMENT	WORKING TEMP.	-10 ~ +60°C (Refer to "Derating Curve")		
	WORKING HUMIDITY	20 ~ 90% RH non-condensing		
	STORAGE TEMP., HUMIDITY	-40 ~ +85°C, 10 ~ 95% RH		
	TEMP. COEFFICIENT	± 0.03%/°C(0 ~ 50 °C)		
	VIBRATION	Component : 10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes ; Mounting : Compliance to IEC60068-2-6		
SAFETY & EMC (Note 4)	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC		
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:>100M Ohms / 500VDC / 25 °C 70% RH		
	EMC EMISSION	Compliance to EN55011, EN55022 (CISPR22), EN61204-3 Class B, EN61000-3-2,-3		
	EMC IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11, EN55024, EN61000-6-2, EN61204-3, heavy industry level, criteria A		
OTHERS	MTBF	346K hrs min. MIL-HDBK-217F (25°C)		
	DIMENSION	55*90*100mm (W*H*D)		
NOTE	1. All parameters NOT specially mentioned are measured at 230VAC input, rate load and 25 °C of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. The power supply is considered a component which will be installed into final equipment. The final equipment must be re-confirmed that it still meets. EMC directives. For guidance on how to perform these EMC tests, please refer "EMI testing of component power supplies". 5. Length of set up time is measured at first cold start. Turning ON/OFF the power supply may lead to increase of the set up time.			

Model Number Structure - Power Supplies



650.96.01.03.01

Series	
650	Series Power Supplies

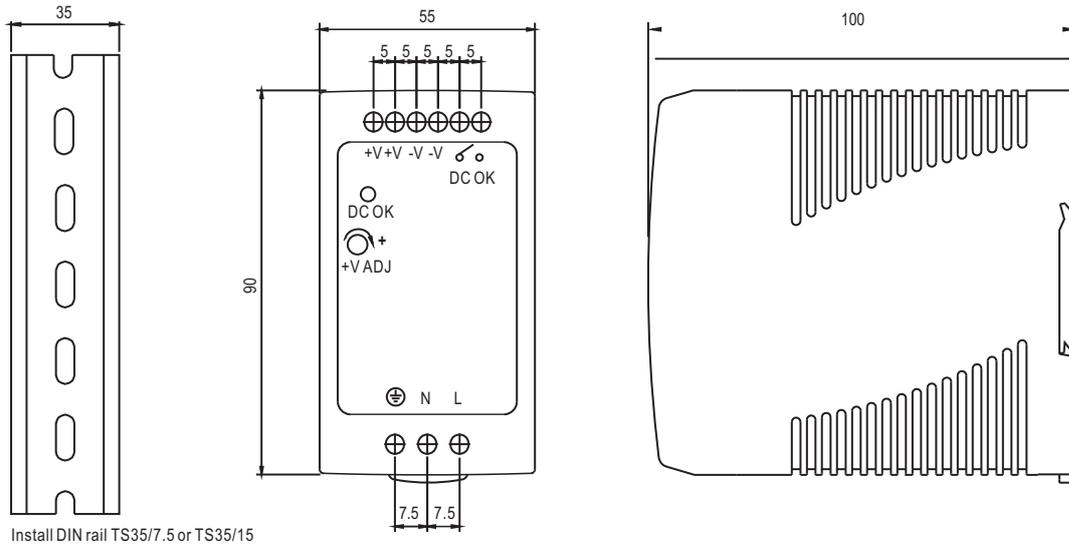
Output Wattage	
96	96W

Optional	
01	with Din Rail

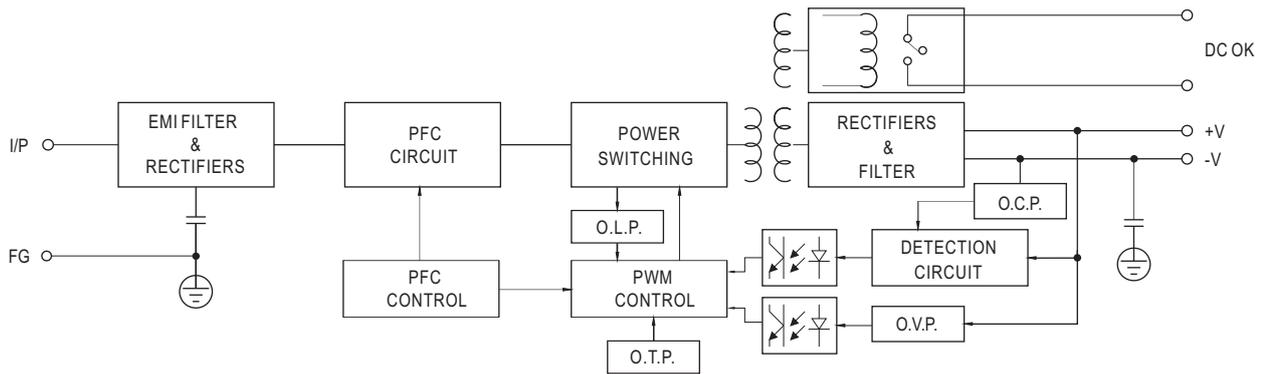
Output Voltage DC	
03	12V 7.5A
04	24V 4A
05	48V 2A

Input Voltage AC	
00	110V
01	220V

Mechanical Specification



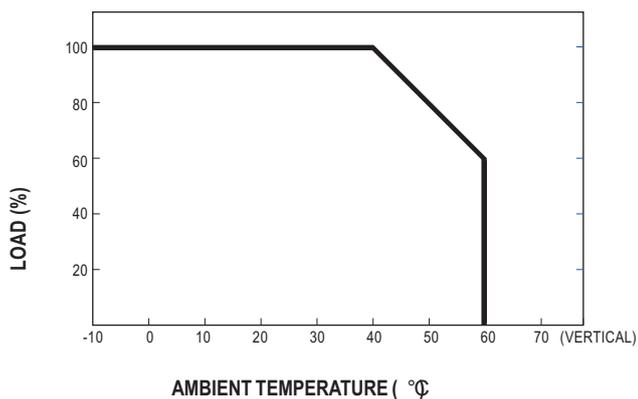
Block Diagram



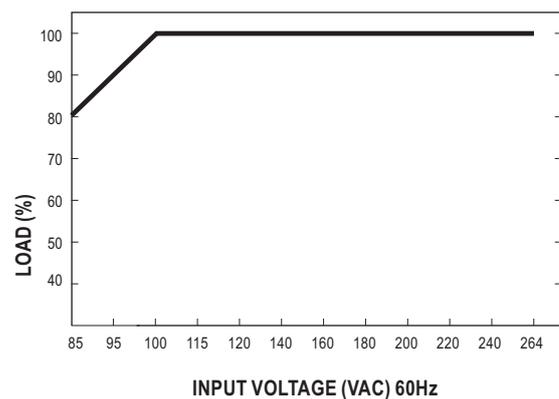
DC OK Relay Contact

Contact Close	PSU turns on / DC OK.
Contact Open	PSU turns off / DC Fail.
Contact Ratings (max.)	30V/1A resistive load.

Derating Curve



Output Derating VS Input Voltage



FEATURES & BENEFITS

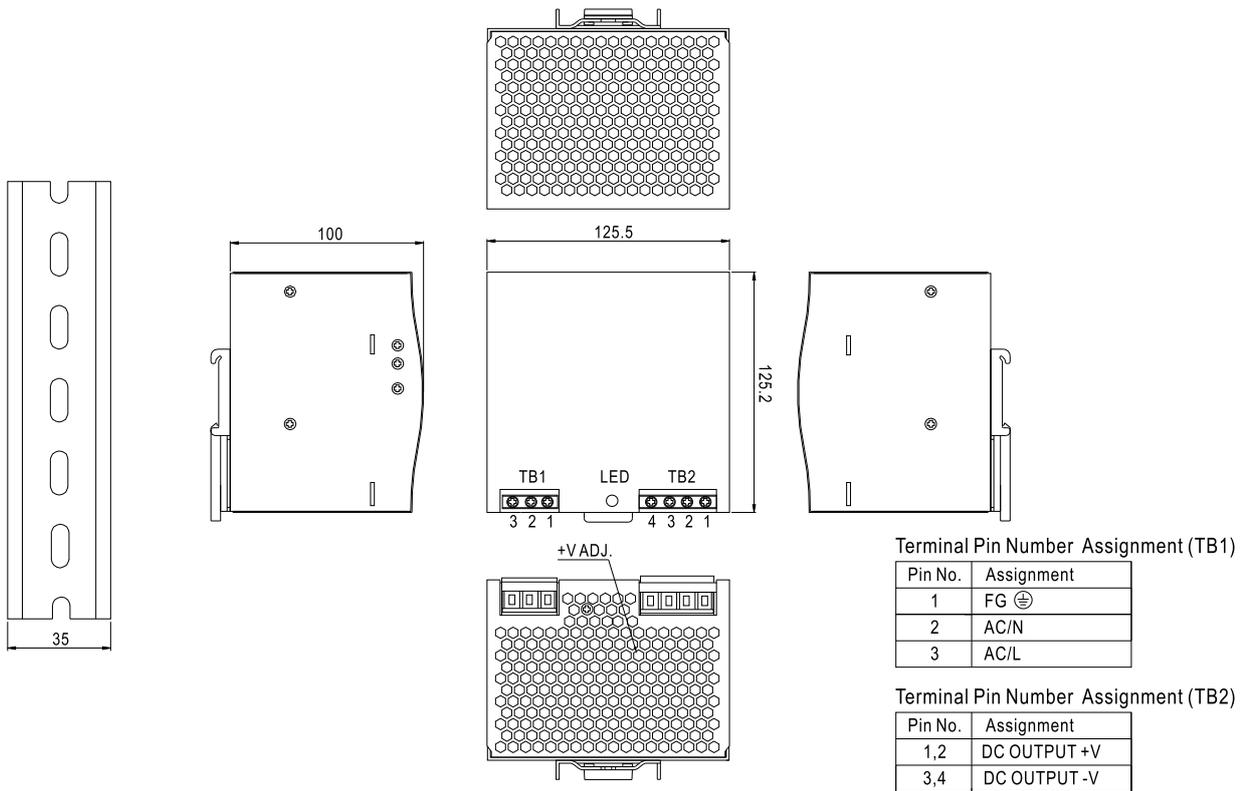
- Universal AC input / Full range
- Built in active PFC function
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Cooling by free air convection
- Can be installed on DIN rail TS-35/7.5 or 15
- UL 508(industrial control equipment)approved
- LED indicator for power on
- 100% full load burn-in test
- Fixed switching frequency at 100KHz
- 3 years warranty



SPECIFICATIONS

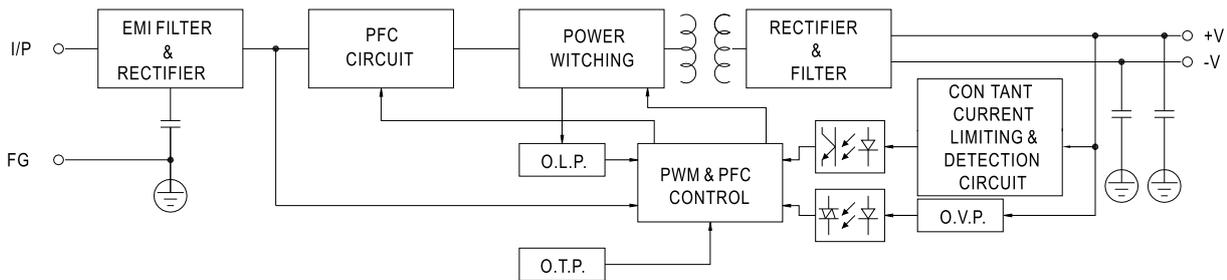
MODEL		650.240.01.04.01	650.240.01.05.01
OUTPUT	DC VOLTAGE	24V	48V
	RATED CURRENT	10A	5A
	CURRENT RANGE	0 ~ 10A	0 ~ 5A
	RATED POWER	240W	240W
	RIPPLE & NOISE (max.) Note.2	80mVp-p	150mVp-p
	VOLTAGE ADJ. RANGE	24 ~ 28V	48 ~ 53V
	VOLTAGE TOLERANCE Note.3	±1.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%
	LOAD REGULATION	±1.0%	±1.0%
	SETUP, RISE TIME	800ms, 40ms/230VAC	800ms, 40ms/115VAC at full load
HOLD UP TIME (Typ.)	24ms/230VAC	24ms/115VAC at full load	
INPUT	VOLTAGE RANGE Note.5	85 ~ 264VAC	120 ~ 370VDC
	FREQUENCY RANGE	47 ~ 63Hz	
	POWER FACTOR (Typ.)	0.96/230VAC	0.99/115VAC at full load
	EFFICIENCY (Typ.)	84%	85%
	AC CURRENT (Typ.)	2.8A/115VAC	1.4A/230VAC
	INRUSH CURRENT (Typ.)	COLD TART 27A/115VAC	45A/230VAC
LEAKAGE CURRENT	<3.5mA / 240VAC		
PROTECTION	OVERLOAD	105 ~ 150% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed	
	OVER VOLTAGE	30 ~ 36V	54 ~ 60V
	OVER TEMPERATURE	100°C±5°C (T W1)d etect on heat sink of power transistor Protection type : hut down o/p voltage, recovers automatically after t emperature goes down	
ENVIRONMENT	WORKING TEMP. Note.5	-10 ~ +70°C (Refer to output load derating curve)	
	WORKING HUMIDITY	20 ~ 90% RH non-condensing	
	STORAGE TEMP., HUMIDITY	-20 ~ +85°C, 10 ~ 95% RH	
	TEMP. COEFFICIENT	±0.03%/°C (0 ~ 50°C)	
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes; Mounting: Compliance to IEC60068-2-6	
SAFETY & EMC (Note 4)	SAFETY STANDARDS	UL508, UL60950-1, TUV EN60950-1 approved	
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC	
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC	
	EMI CONDUCTION & RADIATION	Compliance to EN55011,EN55022 (CI PR22) Class B	
	HARMONIC CURRENT	Compliance to EN61000-3-2,-3	
EMC EMISSION	Compliance to EN61000-4-2,3,4,5,6,8,11, ENV50204, EN55024, EN61000-6-2 (EN50082-2), heavy industry level, criteria A		
OTHERS	MTBF	105.5Khrs min. MIL-HDBK-217F (25°C)	
	DIMENSION	125.5*125.2*100mm (W*H*D)	
	PACKING	1.2Kg; 12pcs/15.5Kg/1.29CUFT	
NOTE	1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. 5. Derating may be needed under low input voltages. Please check the derating curve for more details.		

Mechanical Specification

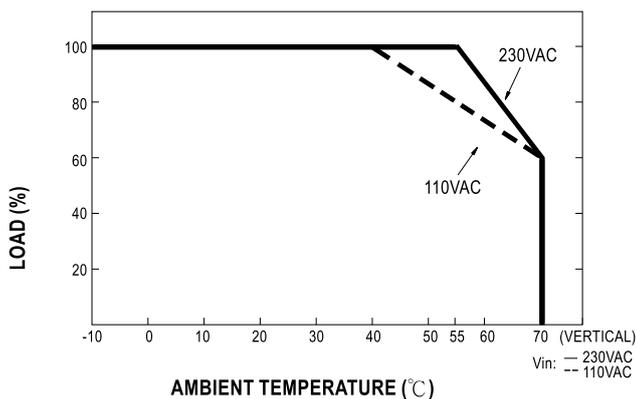


fosc : 100KHz

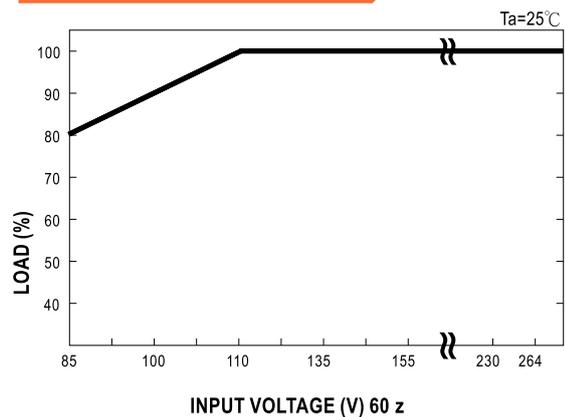
Block Diagram



Derating Curve



Output Derating VS Input Voltage





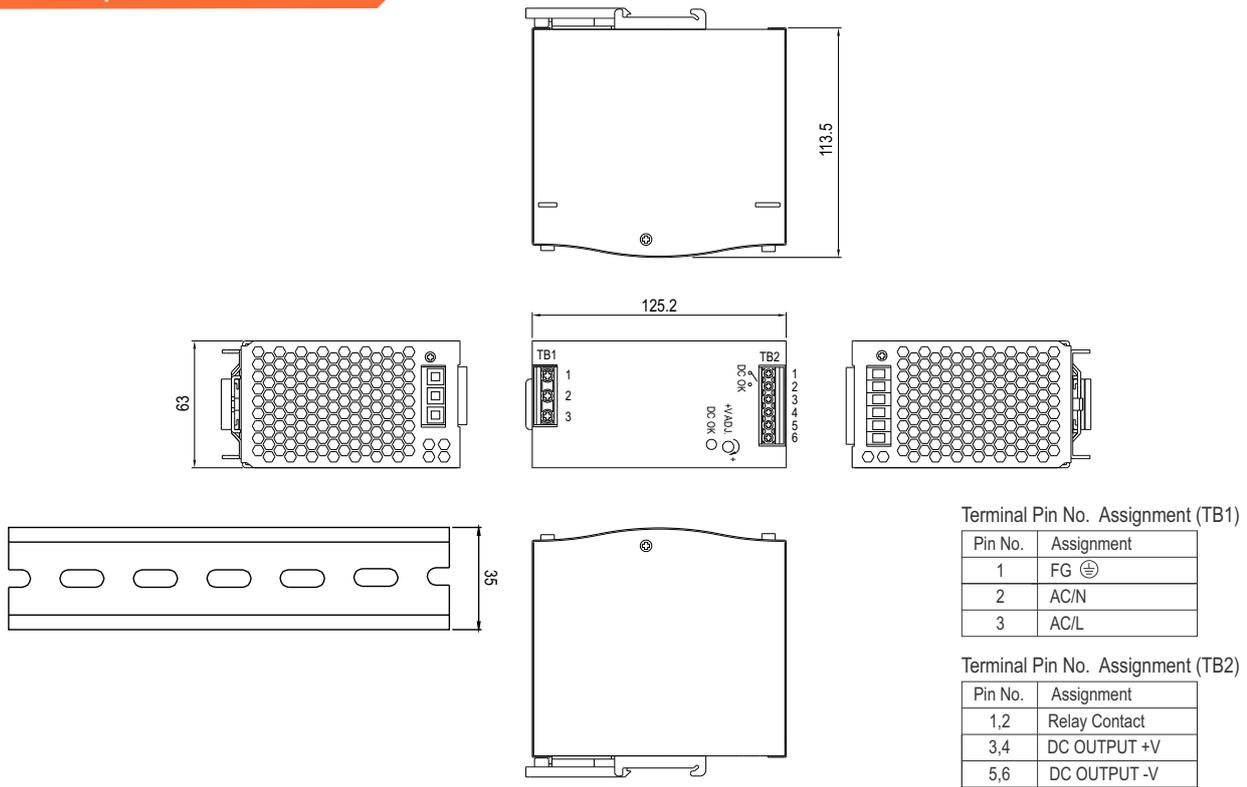
FEATURES & BENEFITS

- ▶ Universal AC Input / Full Range
- ▶ Protections: Short circuit / Overload / Over Voltage / Over temperature
- ▶ ZCS/ZVS technology to reduce power dissipation
- ▶ Cooling by free air convection
- ▶ Can be installed on DIN rail TS-35/7.5 or 15
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- ▶ 2 year warranty

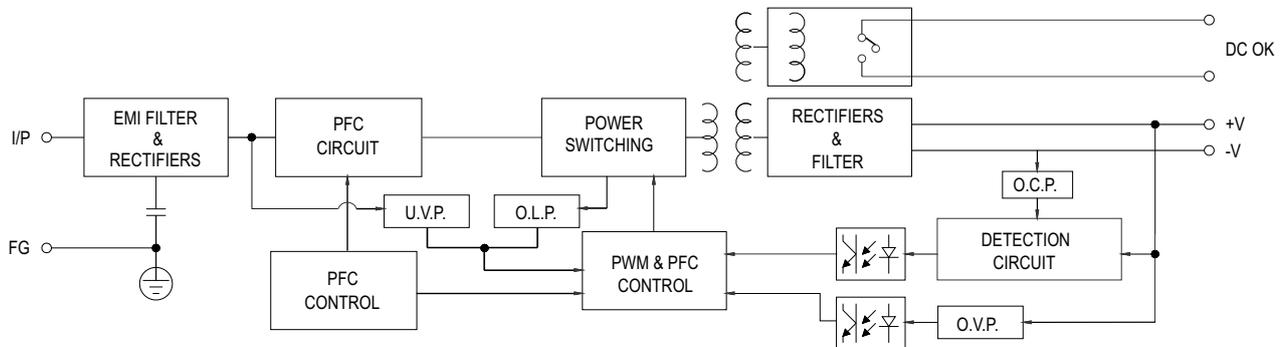
SPECIFICATIONS

MODEL	650.240.01.04.01	650.240.01.05.01	
OUTPUT	DC VOLTAGE	24V	48V
	RATED CURRENT	10A	5A
	CURRENT RANGE	0 ~ 10A	0 ~ 5A
	RATED POWER	240W	240W
	PEAK CURRENT	15A	7.5A
	PEAK POWER <small>Note.6</small>	360W (3sec.)	
	RIPPLE & NOISE (max.) <small>Note.2</small>	100mVp-p	120mVp-p
	VOLTAGE ADJ. RANGE	24 ~ 28V	48 ~ 55V
	VOLTAGE TOLERANCE <small>Note.3</small>	± 1.0%	± 1.0%
	LINE REGULATION	± 0.5%	± 0.5%
	LOAD REGULATION	± 1.0%	± 1.0%
SETUP, RISE TIME	1500ms, 60ms/230VAC	3000ms, 60ms/115VAC at full load	
HOLD UP TIME (Typ.)	20ms/230VAC	20ms/115VAC at full load	
INPUT	VOLTAGE RANGE	88 ~ 264VAC	124 ~ 370VDC
	FREQUENCY RANGE	47 ~ 63Hz	
	POWER FACTOR (Typ.)	0.93/230VAC	0.99/115VAC at full load
	EFFICIENCY (Typ.) <small>Note.8</small>	94%	
	AC CURRENT (Typ.)	2.6A/115VAC	1.3A/230VAC
	INRUSH CURRENT (Typ.)	33A/115VAC	65A/230VAC
LEAKAGE CURRENT	<1mA / 240VAC		
PROTECTION	OVERLOAD	Normally works within 110 ~ 150% rated output power for more than 3 seconds and then shut down o/p voltage with auto-recovery >150% rated power, constant current limiting with auto-recovery within 2 seconds and may cause to shut down if over 2 seconds	
	OVER VOLTAGE	29 ~ 33V	56 ~ 65V
	OVER TEMPERATURE	95°C ± 5°C (TSW : detect on heatsink of power switch) Protection type : Shut down o/p voltage, recovers automatically after temperature goes down	
FUNCTION	DC OK REALY CONTACT RATINGS (max.)	60Vdc/0.3A, 30Vdc/1A, 30Vac/0.5A resistive load	
ENVIRONMENT	WORKING TEMP. <small>Note.5</small>	-25 ~ +70°C (Refer to "Derating Curve")	
	WORKING HUMIDITY	20 ~ 95% RH non-condensing	
	STORAGE TEMP., HUMIDITY	-40 ~ +85°C, 10 ~ 95% RH	
	TEMP. COEFFICIENT	± 0.03%/°C (0 ~ 50°C)	
	VIBRATION	Component: 10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes; Mounting: Compliance to IEC60068-2-6	
SAFETY & EMC <small>(Note 4)</small>	SAFETY STANDARDS	UL508, TUV EN60950-1 approved	
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC O/P-DC OK:0.5KVAC	
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:>100M Ohms / 500VDC / 25°C/ 70% RH	
	EMC EMISSION	Compliance to EN55011, EN55022 (CISPR22), EN61204-3 Class B, EN61000-3-2,-3	
EMC IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11, EN55024, EN61000-6-2 (EN50082-2), EN61204-3, heavy industry level, criteria A, SEMI F47, GL approved		
OTHERS	MTBF	169.3K hrs min.	MIL-HDBK-217F (25°C)
	DIMENSION	63*125.2*113.5mm (W*H*D)	
	PACKING	1.03Kg; 12pcs/13.4Kg/1.06CUFT	
NOTE	<ol style="list-style-type: none"> 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. 5. Installation clearances : 40mm on top, 20mm on the bottom, 5mm on the left and right side are recommended when loaded permanently with full power. In case the adjacent device is a heat source, 15mm clearance is recommended. 6. 3 seconds max., please refer to peak loading curves. 7. Derating may be needed under low input voltage. Please check the derating curve for more details. 8. After 30 minutes of burn-in. 		

Mechanical Specification



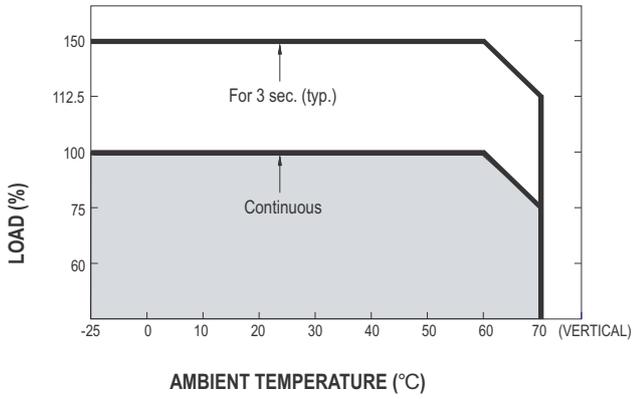
Block Diagram



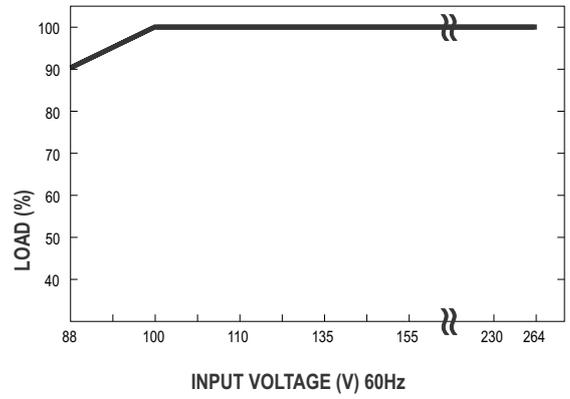
DC OK Relay Contact

Contact Close	PSU turns on / DC OK.
Contact Open	PSU turns off / DC Fail.
Contact Ratings (max.)	30V/1A resistive load.

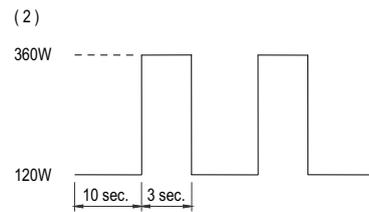
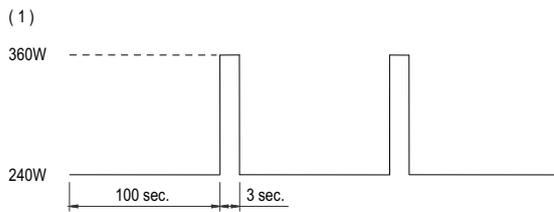
Derating Curve



Output Derating VS Input Voltage



Peak Loading





Living Industrial Partnerships



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