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High voltage pulse noise type : NAP series Low leakage current type : NAM series

\*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

I/O terminals ②Single output

3 Output wattage

Universal input ©Output voltage ®Option

C : with Coating

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA/KHNA30F-5	KHEA/KHNA30F-12	KHEA/KHNA30F-24
MAX OUTPUT WATTAGE[W]	25	27.6	31.2
DC OUTPUT	5V 5A	12V 2.3A	24V 1.3A

	MODEL		KHEA/KHNA30F-5	KHEA/KHNA30F-12	KHEA/KHNA30F-24
	VOLTAGE[V]		AC85 - 264 1 φ (Output derating is re	equired) or DC88 - 370 *11	
INPUT	CUDDENTIAL	ACIN 115V	0.45typ	0.50typ	0.55typ
	CURRENT[A]	ACIN 230V	0.30typ	0.30typ	0.35typ
	FREQUENCY[Hz]		50 / 60 (45 - 440) or DC		
		ACIN 115V	84.0typ	87.0typ	88.5typ
		ACIN 230V	85.5typ	88.5typ	89.5typ
		ACIN 115V	18typ (Io=100%) (at cold start Ta=25	5℃)	
		ACIN 230V	35typ (Io=100%) (at cold start Ta=25	5°C)	
	LEAKAGE CURRENT	[mA]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)		
	VOLTAGE[V]		5	12	24
	CURRENT[A]		5.0	2.3	1.3
	PEAK CURRENT[A]		-	-	-
	LINE REGULATION[n	nV] *2	20max	48max	96max
	LOAD REGULATION[	mV] *2	80max	100max	150max
		0 to +70℃	150max	150max	150max
	RIPPLE[mVp-p] *3	-20 - 0°C	300max	300max	300max
		lo=0 - 30%	300max *4	300max *4	300max *4
OUTDUT		0 to +70℃	180max	180max	180max
OUTPUT	RIPPLE NOISE[mVp-p] *3	-20 - 0°C	360max	360max	360max
			360max *4	360max *4	360max *4
	TEMPERATURE REQUILATIONS NO	0 to +70℃	50max	120max	240max
	TEMPERATURE REGULATION[mV]	-20 to +70°C	60max	150max	290max
	DRIFT[mV] *5		20max	48max	96max
	START-UP TIME[ms]		200typ (ACIN 115V, Io=100%)		
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)		
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		4.50 to 5.50	10.80 to 13.20	22.50 to 28.50
	OUTPUT VOLTAGE SETT	ING[V]	5.00 to 5.15	12.00 to 12.48	24.00 to 24.96
PROTECTION	OVERCURRENT PROTE	CTION	Works over 105% of rating and recovers automatically *10		
CIRCUIT AND	OVERVOLTAGE PROTE	CTION[V]	6.30 to 7.60	13.80 to 16.80	30.00 to 36.00
OTHERS	DC_OK LAMP		LED (Green)		
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)		
ISOLATION	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)		
	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)		
	OPERATING TEMP., HUMID. AND	ALTITUDE	-20 to +70°C (Required to Derating), 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Derating is required)		
ENVIRONMENT	STORAGE TEMP., HUMID. AND A	ALTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)		
ENVIRONMENT	VIBRATION	*8			
	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis (Packing state)		
045557/44/5	AGENCY APPROVALS	AC input	UL60950-1, C-UL (CSA60950-1), EN60950	-1, UL508 (NEC Class2 per UL1310), ANSI/I	SA12.12.01, ATEX, Complies with DEN-AN *
SAFETY AND NOISE	AGENCT APPROVALS	DC input	UL60950-1, C-UL (CSA60950-1), EN	160950-1	
REGULATIONS	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISP	R22-B, EN55011-B, EN55022-B	
	HARMONIC ATTENU	ATOR	Complies with IEC61000-3-2 (Class	A) *6 (Not built-in to active filter) *9	
	CASE SIZE	*7	22.5×75×90mm (W×H×D) [0.89>	<2.95×3.54 inches]	
OTHERS	WEIGHT		165g max	·	
	COOLING METHOD		Convection		

- The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less)is

- The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less) is excluded.

  Please contact us about dynamic load and input response.

  This is the value that measured on measuring board with capacitor of 22 µF and 0.1 µF at 150mm from output terminal.

  Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 2.7.

  Ripple and ripple noise spec is change at 10–0 to 30% by burst operation.

  In case of operating under 0°C ambient temperature, the value is two times of specification at 0 to 30% load factor.
- \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- \*6 Please contact us about another class.
  \*7 Case size contains pairbants.
- Case size contains neither the umbo.

  Only as standard mounting orientation (A). Refer to the instruction manual 5.1. In Install other than standard mounting orientation (A). Refer to the instruction manual 5.1.
   If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
   When two or more units are operating it may not comply with the IEC61000-3-2.
   If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 2.3.

- \*11 Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1°s/V are required.

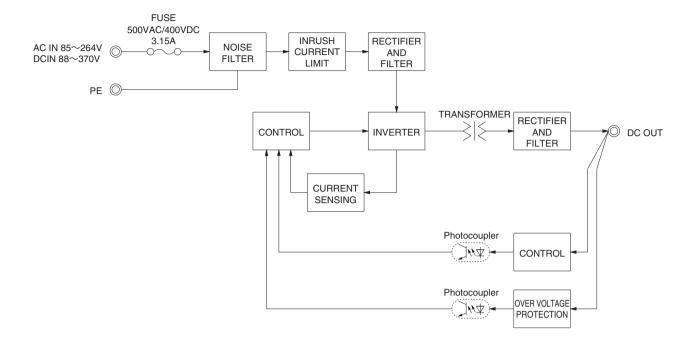
  \* To meet the specifications. Do not operate over-loaded condition.

  \* A sound may occur from power supply at light or peak loading.





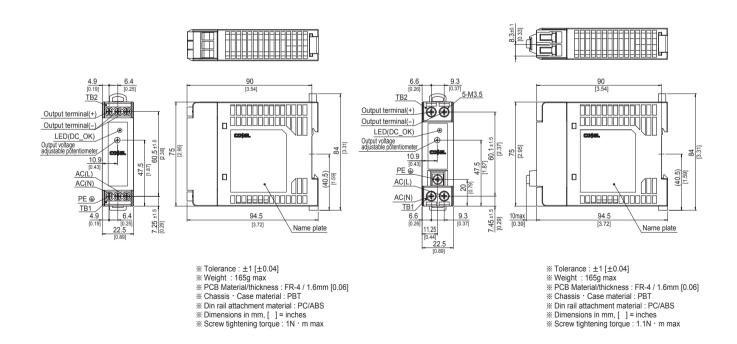
#### Block diagram



#### **External view**

<KHEA30F(Euro Style I/O Terminals)>

<KHNA30F(Barrier Blocks Style I/O Terminals)>



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High voltage pulse noise type : NAP series Low leakage current type : NAM series

\*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

①Series name KHE: Euro style I/O terminals KHN: Barrier blocks style

I/O terminals ②Single output

3 Output wattage Universal input ⑤Output voltage

®Option C : with Coating

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA/KHNA60F-12	KHEA/KHNA60F-24
MAX OUTPUT WATTAGE[W]	54	60
DC OUTPUT	12V 4.5A	24V 2.5A

	MODEL		KHEA/KHNA60F-12	KHEA/KHNA60F-24	
	VOLTAGE[V]		AC85 - 264 1 $\phi$ (Output derating is required) or DC88 -	370 *11	
	OUDDENTIAL	ACIN 115V	1.00typ	1.10typ	
	CURRENT[A]	ACIN 230V	0.60typ	0.70typ	
	FREQUENCY[Hz]		50 / 60 (45 - 440) or DC		
INPUT	EEEIOJENOVIO/1	ACIN 115V	87.0typ	89.0typ	
	EFFICIENCY[%]	ACIN 230V	88.0typ	91.0typ	
	INRUSH CURRENT[A]	ACIN 115V	18typ (Io=100%) (at cold start Ta=25°C)		
	*1	ACIN 230V	35typ (Io=100%) (at cold start Ta=25°C)		
	LEAKAGE CURRENT[mA]		0.45 / 0.75max (ACIN 100V / 240V 60Hz, lo=100%, According to IEC60950-1 and DEN-AN)		
	VOLTAGE[V]		12	24	
	CURRENT[A]		4.5	2.5	
	PEAK CURRENT[A]		-	-	
	LINE REGULATION[n	nV] *2	48max	96max	
	LOAD REGULATION	mV] *2	100max	150max	
		0 to +70°C	200max	200max	
	RIPPLE[mVp-p] *3	-20 - 0°C	300max	300max	
		lo=0 - 30%	300max *4	300max *4	
ОИТРИТ		0 to +70°C	260max	260max	
JUIPUI	RIPPLE NOISE[mVp-p] *3	-20 - 0°C	360max	360max	
		lo=0 - 30%	360max *4	360max *4	
	TEMPERATURE REGULATION[mV]	0 to +70°C	120max	240max	
		-20 to +70°C	150max	290max	
	DRIFT[mV] *5		48max	96max	
	START-UP TIME[ms]		200typ (ACIN 115V, Io=100%)		
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)		
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		10.80 to 13.20	22.50 to 28.50	
	OUTPUT VOLTAGE SETT	ING[V]	12.00 to 12.48	24.00 to 24.96	
PROTECTION	OVERCURRENT PROTE	ECTION	Works over 105% of rating and recovers automatically	*10	
CIRCUIT AND	OVERVOLTAGE PROTE	CTION[V]	13.80 to 16.80	30.00 to 36.00	
OTHERS	DC_OK LAMP		LED (Green)		
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50I		
SOLATION	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)		
	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature)		
	OPERATING TEMP., HUMID. AND	ALTITUDE	-20 to +70°C (Required to Derating), 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Derating is required)		
ENVIRONMENT	STORAGE TEMP., HUMID. AND A	ALTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)		
LIVIIIONWEIVI	VIBRATION	*8			
	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis (Packing state)		
SAFETY AND	AGENCY APPROVALS		UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508 (NEC Class2 per UL1310), ANSI/ISA12.12.01, ATEX, Complies with DEN-AN *		
NOISE	AGENOT ATTHOVALO	DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1		
REGULATIONS	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B		
	HARMONIC ATTENU	ATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-in to	o active filter) *9	
	CASE SIZE	*7	32×90×90mm (W×H×D) [1.26×3.54×3.54 inches]		
OTHERS	WEIGHT		270g max		
	COOLING METHOD		Convection		

- The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less)is

- The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less) is excluded.
  Please contact us about dynamic load and input response.
  This is the value that measured on measuring board with capacitor of 22 µF and 0.1 µF at 150mm from output terminal.
  Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 2.7.
  Ripple and ripple noise spec is change at 10–0 to 30% by burst operation.
  In case of operating under 0°C ambient temperature, the value is two times of specification at 0 to 30% load factor.
- \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- \*6 Please contact us about another class.
  \*7 Case size contains polither #1
- Case size contains neither the umbo.

  Only as standard mounting orientation (A). Refer to the instruction manual 5.1. In Install other than standard mounting orientation (A). Refer to the instruction manual 5.1.
   If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
   When two or more units are operating it may not comply with the IEC61000-3-2.
   If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 2.3.

- \*11 Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1°s/V are required.

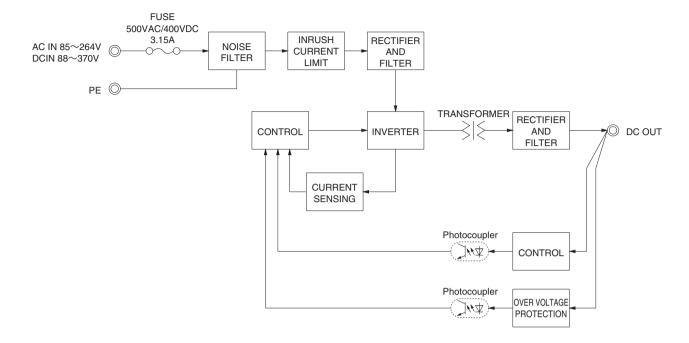
  \* To meet the specifications. Do not operate over-loaded condition.

  \* A sound may occur from power supply at light or peak loading.





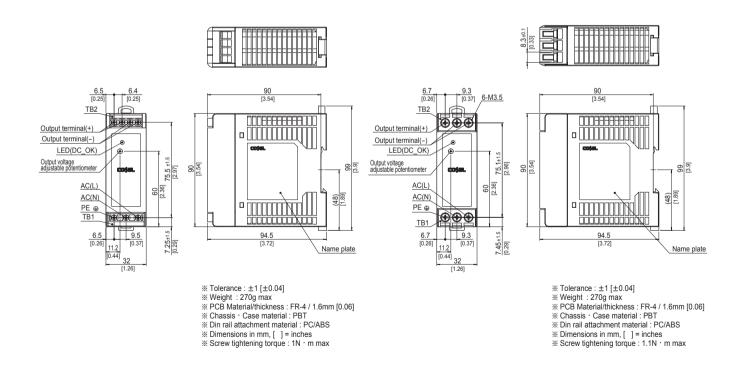
#### Block diagram



#### **External view**

<KHEA60F(Euro Style I/O Terminals)>

<KHNA60F(Barrier Blocks Style I/O Terminals)>



# KHEA/KHNA

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High voltage pulse noise type : NAP series Low leakage current type : NAM series \*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

I/O terminals ②Single output

3 Output wattage

(4) Universal input ©Output voltage ® Option

C : with Coating E: NEC Class2 (24V)

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA/KHNA90F-12	KHEA/KHNA90F-24
MAX OUTPUT WATTAGE[W]	81.6	91.2
DC OUTPUT	12V 6.8A	24V 3.8A

	MODEL		KHEA/KHNA90F-12	KHEA/KHNA90F-24	
	VOLTAGE[V]		AC85 - 264 1 φ (Output derating is required) or DC88-	250 *10	
	OUDDENETAL	ACIN 115V	0.85typ	0.95typ	
	CURRENT[A]	ACIN 230V	0.45typ	0.55typ	
	FREQUENCY[Hz]		50 / 60 (45 - 66) or DC		
		ACIN 115V	87.0typ	89.0typ (88.0typ for option -E)	
INPUT	EFFICIENCY[%]	ACIN 230V	88.0typ	91.0typ (89.5typ for option -E)	
	POWER FACTOR	ACIN 115V	0.98typ	7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	
	(lo=100%)	ACIN 230V	0.86typ		
	INRUSH CURRENT[A]	ACIN 115V	18typ (Io=100%) (at cold start Ta=25℃)		
	*1 ACIN 230V		35typ (Io=100%) (at cold start Ta=25°C)		
	LEAKAGE CURRENT		0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, Ac	ccording to IEC60950-1 and DEN-AN)	
	VOLTAGE[V]	• •	12	24	
	CURRENT[A]		6.8	3.8	
	PEAK CURRENT[A]		-	-	
	LINE REGULATION[n	nV1 *2	48max	96max	
	LOAD REGULATION		100max	150max	
		<del>-</del>	200max	200max	
	RIPPLE[mVp-p] *3	-20 - 0°C	300max	300max	
	[	Io=0 - 30%		300max *4	
		0 to +70°C	260max	260max	
OUTPUT	RIPPLE NOISE[mVp-p] *3		360max	360max	
	im i zz itoloz[im p p]		360max *4	360max *4	
		0 to ±70°C		240max	
	TEMPERATURE REGULATION[mV]	-20 to +70°C	150max	290max	
	DRIFT[mV]	*5	48max	96max	
	START-UP TIME[ms]		500typ (ACIN 115V, Io=100%)	Comax	
	HOLD-UP TIME[ms]		20typ (ACIN 115V, I0=100%)		
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		10.80 to 13.20	22.50 to 28.50 (Fixed for option -E)	
	OUTPUT VOLTAGE SETTING[V]		12.00 to 12.48	24.00 to 24.96 (24.00 to 24.50 for option -E)	
PROTECTION	OVERCURRENT PROTE		Works over 105% of rating (101% for option -E), recover		
CIRCUIT AND	OVERVOLTAGE PROTE		13.80 to 16.80	30.00 to 36.00 (26.40 to 33.60 for option -E)	
OTHERS	DC OK LAMP	011011[1]	LED (Green)	00.00 to 00.00 (20.10 to 00.00 for option 2)	
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)		
ISOLATION	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)		
IOOLATION	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature)		
	OPERATING TEMP., HUMID. AND	AI TITUDE	-20 to +70°C (Required to Derating), 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Derating is required)		
	STORAGE TEMP., HUMID. AND		-30 to +85°C, 20 - 90%RH (Non condensing)		
ENVIRONMENT	VIBRATION	*8	, , , , , , , , , , , , , , , , , , , ,		
	IMPACT		196.1m/s² (20G), 11ms, X, Y and Z axis (Packing state)		
		AC input		output only option -E), ANSI/ISA12.12.01, ATEX, Complies with DEN-AN	
SAFETY AND	AGENCY APPROVALS	DC input		output only option Ej, 7110/10/11E.11E.01, 711EX, complice with BEN 711	
NOISE	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B	3 FN55022-B	
REGULATIONS	HARMONIC ATTENUATOR		Complies with IEC61000-3-2 (Class A) *6		
	CASE SIZE	*7	50×90×90mm (W×H×D) [1.97×3.54×3.54 inches]		
OTHERS	WEIGHT	*1	405g max		
JIILING			Convection		
	COOLING METHOD		OOHVEGROOM		

- The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less) is excluded. Please contact us about dynamic load and input response. This is the value that measured on measuring board with capacitor of 22 µF and 0.1 µF at 150mm from Into is the value that measured on measuring poars with capacitor of 22 pF and 0.1 pF at 150mm from output terminal.

  Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 2.7.

  Ripple and ripple noise spec is change at 10=0 to 30% by burst operation. In case of operating under 0°C ambient temperature, the value is two times of specification at 0 to 30% load factor.
- 30% load factor.

  \*5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the

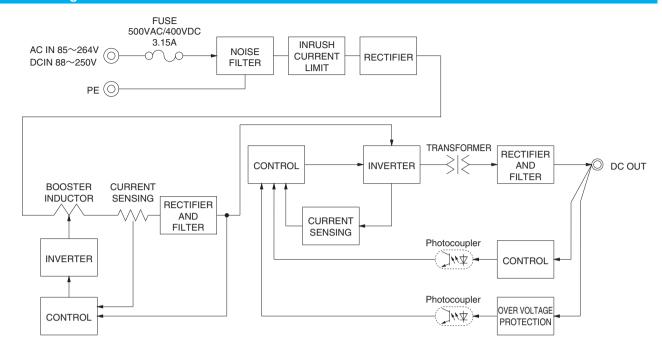
- input voltage held constant at the rated input/output.
  Please contact us about another class.
  Case size contains neither the umbo.
  Only as standard mounting orientation (A). Refer to the instruction manual 5.1.
  If install other than standard mounting orientation (A), please fix the power supply for withstand the withartin and impact
- If install other than standard mounting orientation (A), please fix the power supply for withstand the wibration and impact.

  If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 2.3.

  Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1°K/V are required.
- To meet the specifications. Do not operate over-loaded condition
- A sound may occur from power supply at light or peak loading.



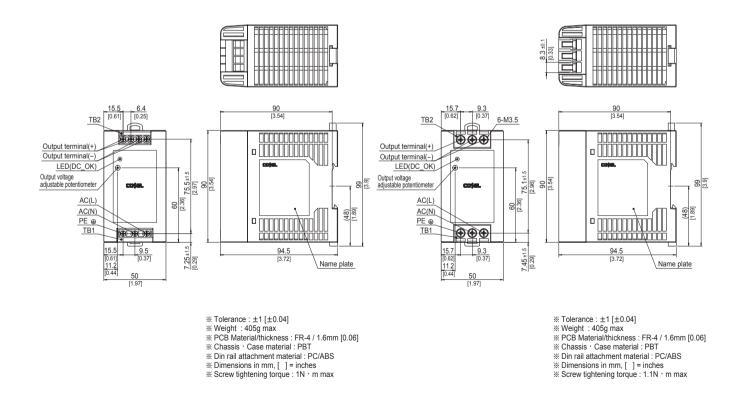
#### Block diagram



#### **External view**

<KHEA90F(Euro Style I/O Terminals)>

<KHNA90F(Barrier Blocks Style I/O Terminals)>











High voltage pulse noise type : NAP series Low leakage current type : NAM series \*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

Example recommended EMI/EMC filter
NAC-04-472-D

1 Series name
KHE: Euro style I/O terminals
KHN: Barrier blocks style I/O terminals ②Single output 3 Output wattage
4 Universal input
5 Output voltage
6 Option

C: with Coating
N2: Screw mounting

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA / KHNA120F-24
MAX OUTPUT WATTAGE[W]	120
DC OUTPUT	24V 5A (Peak 7.5A)

	MODEL		KHEA / KHNA120F-24
	VOLTAGE[V]		AC85 - 264 1 φ or DC88 - 370 *10
		ACIN 115V	1.2typ
	CURRENT[A]		0.6typ
	FREQUENCY[Hz]		50 / 60 (45 - 66) or DC
		ACIN 115V	90typ
NPUT	EFFICIENCY[%]	ACIN 230V	92typ
		ACIN 115V	0.98typ
	POWER FACTOR	ACIN 230V	0.93typ
	INRUSH CURRENT[A]	ACIN 115V	15typ (at cold start Ta=25°C)
		ACIN 230V	30typ (at cold start Ta=25℃)
	LEAKAGE CURRENT[mA]		0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)
	VOLTAGE[V]	[]	24
	CURRENT[A]		5
	PEAK CURRENT[A]	*2	7.5
	LINE REGULATION[n		96max
	LOAD REGULATION		150max *4
	- SAD HEGGERHON	0 to +70°C	
	RIPPLE[mVp-p] *5	-25 - 0°C	240max
	I I I LELIMY P P J	Io=0 - 30%	
		0 to +70°C	150max
UTPUT	RIPPLE NOISE[mVp-p] *5		300max
	I III I EE NOIDE[IIIVP-P]	Io=0 - 30%	300max *4
		0 to +70°C	240max *4
	TEMPERATURE REGULATION[mV]	-25 to +70°C	360max *4
	DRIFT[mV]	*6	96max
	START-UP TIME[ms]		750max (ACIN 115V, Io=100%)
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		22.5 to 28.5
	OUTPUT VOLTAGE ADJUSTMENT HANGE[V]		24.0±1.0%
	OVERCURRENT PROTE		Works over 101% of peak current and recovers automatically
	OVERVOLTAGE PROTE		30.0 to 36.0
ROTECTION			Provided
IRCUIT AND	REMOTE ON/OFF (RO	•)	LED (Green)
THERS	ALARM LAMP		LED (Red)
	DC OK CONTACT		Relay contact 30VDC 1A max, 30VAC 0.5A max (resistive load) (Only KHEA)
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)
	INPUT-PE		AC2,000V Thinlute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)
OLATION	OUTPUT-PE		AC500V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)
	OUTPUT-RC, DC_OK	ALTITUDE	AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature)
	OPERATING TEMP.,HUMID.AND		-25 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Derating is required)
VVIRONMENT	STORAGE TEMP., HUMID. AND A		-40 to +85°C, 20 - 90%RH (Non condensing)
	VIBRATION *9		10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)
	IMPACT	AC inner	196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)
AFETY AND	AGENCY APPROVALS		UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, ANSI/ISA12.12.01, ATEX, GL, Complies with DEN-AN
OISE	CONDUCTED NOISE	input	UL60950-1, C-UL (CSA60950-1), EN60950-1
EGULATIONS	CONDUCTED NOISE	1705	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B
	HARMONIC ATTENUA		Complies with IEC61000-3-2 (Class A) *7
	CASE SIZE	*8	37×124×117mm (W×H×D) [1.46×4.88×4.61 inches]
THERS	WEIGHT		580g max
	COOLING METHOD		Convection

## KH series



- The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less) is excluded.
- Refer to 3, instruction manual.
- Refer to 3, instruction manual. Please contact us about dynamic load and input response. The output voltage is below 23.5V, the value is equal to three times of the specification. This is the value that measured on measuring board with capacitor of 22 µF and 0.1 µF at 150mm from output terminal.
- Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).
- Please refer to the instruction manual 2.7 Please refer to the instruction manual 2.7. Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/ output. Please contact us about another class. Case size contains neither the umbo.

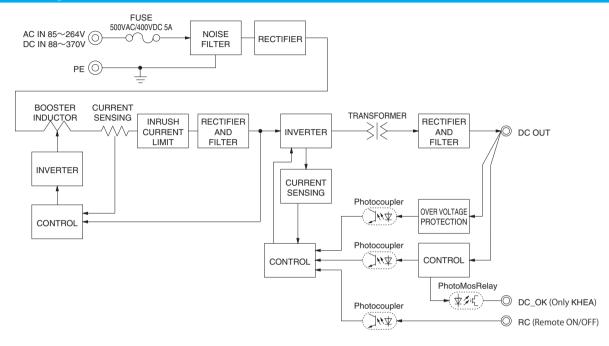
- Only as standard mounting orientation (A). Refer to the instruction manual 5.1 If install other than standard mounting orientation (A), please fix the power
- in install other than standard mounting orientation (A), please if it the powe supply for withstand the vibration and impact.

  \*10 Under low DC input voltage below DC110V, the temperature derating -1°5/V are required.

  \* To meet the specifications. Do not operate over-loaded condition.

  \* A sound may occur from power supply at light or peak loading.

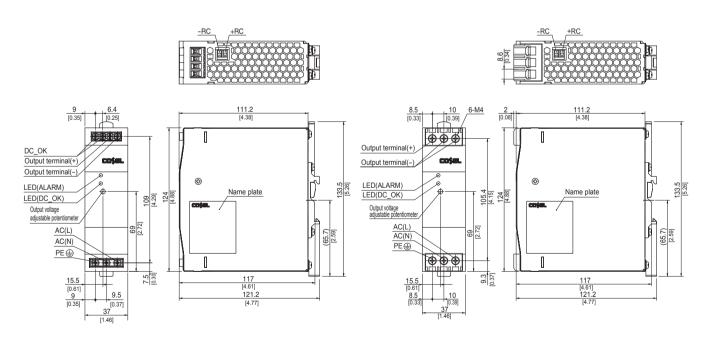
### Block diagram



#### **External view**

#### <KHEA120F(Euro Style I/O Terminals)>

### <KHNA120F(Barrier Blocks Style I/O Terminals)>



- X Tolerance: ±1 [±0.04]
- Weight: 580g max
- PCB Material/thickness: FR-4 / 1.6mm [0.06]
- Chassis material: Aluminum
- \* Case material : Stainless steel
- \* DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- Screw tightening torque: 1N · m max

- \*\* Tolerance : ±1 [±0.04]
- ※ Weight : 580g max
- PCB Material/thickness: FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- \* DIN rail attachment material : Aluminum, Stainless steel, Nylon
- \* Dimensions in mm, [ ] = inches
- Screw tightening torque : 1.6N · m max









High voltage pulse noise type : NAP series Low leakage current type : NAM series \*A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

I/O terminals

②Single output 3 Output wattage
4 Universal input
5 Output voltage
6 Option

C: with Coating
N2: Screw mounting

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA / KHNA240F-24
MAX OUTPUT WATTAGE[W]	240
DC OUTPUT	24V 10A (Peak 15A)

	MODEL		KHEA / KHNA240F-24
	VOLTAGE[V]		AC85 - 264 1 φ or DC88 - 370 *10
	OUDDENITE AT	ACIN 115V	2.3typ
	CURRENT[A]	ACIN 230V	1.2typ
	FREQUENCY[Hz]		50 / 60 (45 - 66) or DC
		ACIN 115V	92typ
PUT	EFFICIENCY[%]	ACIN 230V	94typ
		ACIN 115V	
	POWER FACTOR	ACIN 230V	0.93typ
	INRUSH CURRENT[A]	ACIN 115V	
	*1	ACIN 230V	40typ (more than 3 sec. to re-start)
	LEAKAGE CURRENT	[mA]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)
	VOLTAGE[V]	<u> </u>	24
	CURRENT[A]		10
	PEAK CURRENT[A]	*2	15
	LINE REGULATION[n	1V1 *3	
	LOAD REGULATION		150max *4
			120max
	RIPPLE[mVp-p] *5	-25 - 0°C	240max
		lo=0 - 30%	
		0 to +70°C	150max
UTPUT	RIPPLE NOISE[mVp-p] *5		300max
			300max *4
		0 to +70°C	
	TEMPERATURE REGULATION[mV]		360max *4
	DRIFT[mV] *6		96max
	START-UP TIME[ms]		750max (ACIN 115V, Io=100%)
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		22.5 to 28.5
	OUTPUT VOLTAGE SETT		24.0±1.0%
	OVERCURRENT PROTE		Works over 101% of peak current and recovers automatically
	OVERVOLTAGE PROTEC		30.0 to 36.0
ROTECTION	REMOTE ON/OFF (RO		Provided
RCUIT AND	DC_OK LAMP	-,	LED (Green)
THERS	ALARM LAMP		LED (Red)
	DC_OK CONTACT		Relay contact 30VDC 1A max, 30VAC 0.5A max (resistive load) (Only KHEA)
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)
	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)
OLATION	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature)
	OUTPUT-RC, DC_OK		AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature)
	OPERATING TEMP., HUMID. AND		-25 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Derating is required)
	STORAGE TEMP., HUMID.AND A		-40 to +85°C, 20 - 90%RH (Non condensing)
IVIRONMENT	VIBRATION		10 - 55Hz, 19.6m/s <sup>2</sup> (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)
	IMPACT		196.1m/s <sup>2</sup> (20G), 11ms, once each X, Y and Z axis (Packing state)
		AC input	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, ANSI/ISA12.12.01, ATEX, GL, Complies with DEN-AN
FETY AND	AGENCY APPROVALS		UL60950-1, C-UL (CSA60950-1), EN60950-1
OISE	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B
GULATIONS	HARMONIC ATTENUA	ATOR	Complies with IEC61000-3-2 (Class A) *7
	CASE SIZE	*8	50×124×117mm (W×H×D) [1.97×4.88×4.61 inches]
THERS	WEIGHT		900g max
	COOLING METHOD		The state of the s

## KH series



- The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less) is excluded.
- Refer to 3, instruction manual.
- Refer to 3, instruction manual. Please contact us about dynamic load and input response. The output voltage is below 23.5V, the value is equal to three times of the specification. This is the value that measured on measuring board with capacitor of 22 µF and 0.1 µF at 150mm from output terminal.
- Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).
- Please refer to the instruction manual 2.7
- Please refer to the instruction manual 2.7. Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/ output. Please contact us about another class. Case size contains neither the umbo.

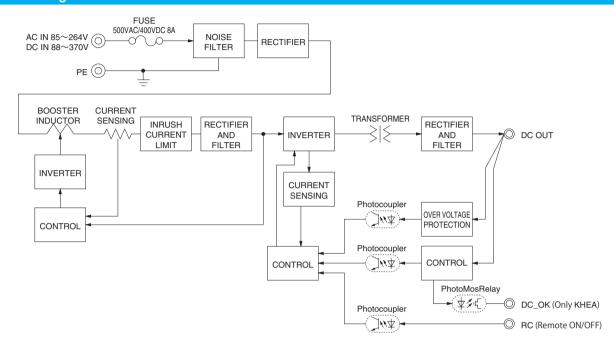
- Only as standard mounting orientation (A). Refer to the instruction manual 5.1 If install other than standard mounting orientation (A), please fix the power
- in install other than standard mounting orientation (A), please if it the powe supply for withstand the vibration and impact.

  \*10 Under low DC input voltage below DC110V, the temperature derating -1°5/V are required.

  \* To meet the specifications. Do not operate over-loaded condition.

  \* A sound may occur from power supply at light or peak loading.

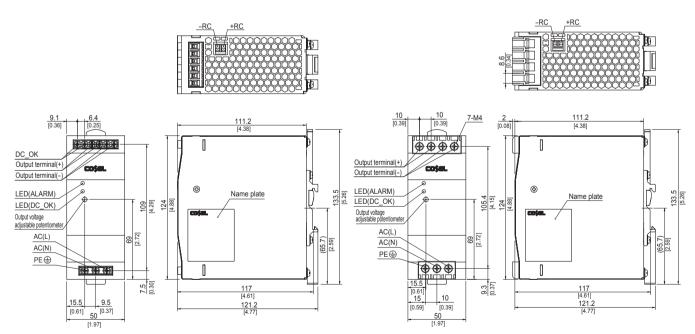
#### **Block diagram**



#### **External view**

### <KHEA240F(Euro Style I/O Terminals)>

#### <KHNA240F(Barrier Blocks Style I/O Terminals)>



- X Tolerance: ±1 [±0.04]
- ※ Weight : 900g max
- \* PCB Material/thickness : FR-4 / 1.6mm [0.06]
- \* Chassis material : Aluminum
- \* Case material : Stainless steel
- ※ DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- % Screw tightening torque : 1N · m max

- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 900g max
- \* PCB Material/thickness : FR-4 / 1.6mm [0.06]
- \* Chassis material : Aluminum
- Case material: Stainless steel
- ※ DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- Screw tightening torque: 1.6N m max









High voltage pulse noise type : NAP series Low leakage current type : NAM series \*\* A higher current rating EMI/EMC filter may be recommended in view of the other devices that could be connected in parallel with the power supply.

Example recommended EMI/EMC filter
NAC-10-472-D

Series name
KHE: Euro style I/O terminals
KHN: Barrier blocks style I/O terminals ②Single output

3 Output wattage
4 Universal input
5 Output voltage
6 Option C: with Coating
N2: Screw mounting

\*Make sure necessary tests will be carried out on your end equipment with the power supply installed in accordance with any required EMC/EMI regulations.

MODEL	KHEA / KHNA480F-24	KHEA / KHNA480F-48
MAX OUTPUT WATTAGE[W]	480	480
DC OUTPUT	24V 20A (Peak 30A)	48V 10A (Peak 15A)

	MODEL		KHEA / KHNA480F-24	KHEA / KHNA480F-48	
	VOLTAGE[V]		AC85 - 264 1 $\phi$ (Output derating is required) or DC88 -	350 *10	
		ACIN 115V	\ , , , , , , , , , , , , , , , , , , ,		
	CURRENT[A]	ACIN 230V			
	FREQUENCY[Hz]		50 / 60 (45 - 66) or DC		
		ACIN 115V			
INPUT	EFFICIENCY[%]	ACIN 230V	94typ		
0.		ACIN 115V	0.98typ		
	POWER FACTOR	ACIN 230V	0.93typ		
	INRUSH CURRENT[A]	ACIN 115V	20typ (more than 3 sec. to re-start)		
	*1	ACIN 230V	40typ (more than 3 sec. to re-start)		
	LEAKAGE CURRENT		0.75 / 1.5max (ACIN 100V / 240V 60Hz, Io=100%, Acc	cording to IEC60950-1 and DEN-AN)	
	VOLTAGE[V]	[IIIA]	24	48	
	CURRENT[A]		20	10	
	PEAK CURRENT[A]	*2	30	15	
	LINE REGULATION[n		96max (Io=30-100%) *9	192max (Io=30-100%) *9	
	LOAD REGULATION		150max (Io=30-100%) *9	300max (Io=30-100%) *9	
	EGAD HEGGEATION	0 to +70°C	120max	120max (10=30-100 /8) ***	
	RIPPLE[mVp-p] *4	-25 - 0°C	240max	240max	
	niPPLE[iiivp-p] **			750max	
		0 to +70°C	150max	150max	
OUTPUT	RIPPLE NOISE[mVp-p] *4	-25 - 0°C	300max	300max	
	THEFTE NOISE[IIIVP-P]	lo=0 - 30%	600max	750max	
		0 to +70°C	240max	480max	
	TEMPERATURE REGULATION[mV]	-25 to +70°C	360max	600max	
	DRIFT[mV] *5		96max	192max	
	START-UP TIME[ms]		750max (ACIN 115V, Io=100%)		
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)		
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		22.5 to 26.4	45.0 to 55.2	
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		24.0±1.0%	48.0±1.0%	
	OVERCURRENT PROTE		Works over 101% of peak current and recovers automa	· ·	
	OVERVOLTAGE PROTECTION[V]		30.0 to 36.0	57.6 to 67.2	
PROTECTION	REMOTE ON/OFF (RO		Provided	37.0 to 07.2	
CIRCUIT AND	DC_OK LAMP	,	LED (Green)		
OTHERS	ALARM LAMP	-	LED (Red)		
	DC OK CONTACT	-	Relay contact 30VDC 1A max, 30VAC 0.5A max (resistive load) (Only KHEA)		
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50		
	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)		
ISOLATION	OUTPUT-PE		AC5,000V 1minute, Cutoff current = 10mA, DC500V 50M $\Omega$ min (At Room Temperature)		
	OUTPUT-RC, DC_OK		AC500V 1minute, Cutoff current = 100mA, DC500V 50M $\Omega$ min (At Room Temperature)		
	OPERATING TEMP., HUMID. AND			<u> </u>	
	STORAGE TEMP., HUMID. AND A		-25 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Derating is required) -40 to +85°C, 20 - 90%RH (Non condensing)		
ENVIRONMENT	VIBRATION	*8	,	s along 7 axis (Non operating, mounted on DIN Rail)	
	IMPACT *8		10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)   196.1m/s² (20G), 11ms, once each X, Y and Z axis (Packing state)		
	İ	AC innut		SI/ISA12.12.01, ATEX, GL (Only 24V), Complies with DEN-AN	
SAFETY AND	AGENCY APPROVALS		UL60950-1, C-UL (CSA60950-1), EN60950-1	5	
NOISE	CONDUCTED NOISE		UL60950-1, C-UL (USA60950-1), EN60950-1   Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
REGULATIONS	HARMONIC ATTENUATOR		Complies with IEC61000-3-2 (Class A) *6		
	CASE SIZE	*7	70×124×117mm (W×H×D) [2.76×4.88×4.61 inche	25]	
OTHERS	WEIGHT		1,200g max	,,,,	
OTTLING	COOLING METHOD		Convection		
	COOLING WEI HOD		Convection		

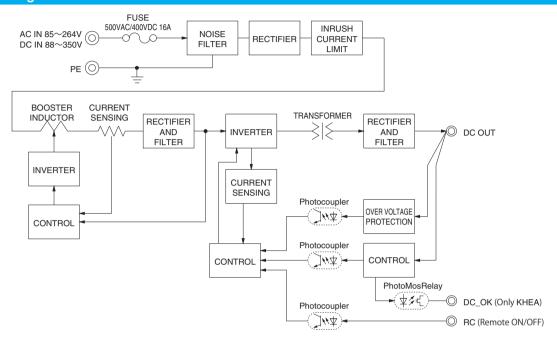
## KH series C



- The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less)is excluded
- Refer to 3, instruction manual.
- Refer to 3, instruction manual. Please contact us about dynamic load and input response. This is the value that measured on measuring board with capacitor of 22 µF and 0.1 µF at 150mm from output terminal. Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).
- Please refer to the instruction manual 2.7. Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/ outnut

- output.
  Please contact us about another class.
  Case size contains neither the umbo.
  Only as standard mounting orientation (A), Refer to the instruction manual 5.1.
  If install other than standard mounting orientation (A), please fix the power
- supply for withstand the vibration and impact. Burst operation at 30% load or less.
- #99 Burrst operation at 30% load or less.
  #10 Under low DC input voltage below DC110V, the temperature derating
  -1°C/V or the output power derating -1°S/V are required.
  #10 meet the specifications. Do not operate over-loaded condition.
  #10 A sound may occur from power supply at light or pack loading.

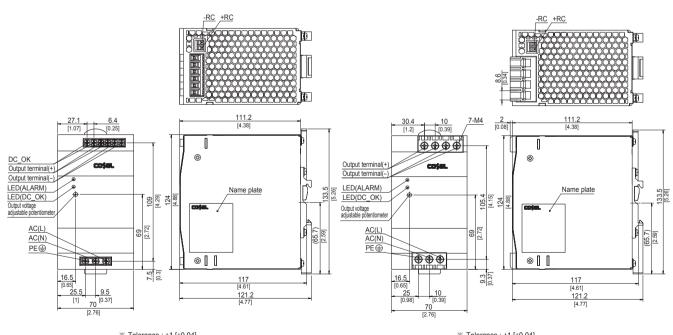
#### **Block diagram**



#### **External view**

#### <KHEA480F(Euro Style I/O Terminals)>

### <KHNA480F(Barrier Blocks Style I/O Terminals)>



- X Tolerance : ±1 [±0.04]
- \* Weight : 1,200g max
- \* PCB Material/thickness : FR-4 / 1.6mm [0.06]
- Chassis material: Aluminum
- ※ Case material : Stainless steel
- \* DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- ※ Screw tightening torque: 1N ⋅ m max

- \*\* Tolerance: ±1 [±0.04]
- \* Weight : 1,200g max
- \* PCB Material/thickness : FR-4 / 1.6mm [0.06]
- Chassis material : Aluminum
- ※ Case material : Stainless steel
- \* DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [ ] = inches
- Screw tightening torque: 1.6N m max

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