30









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 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/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

SPECIFICATIONS

	MODEL		KHEA/KHNA30F-5	KHEA/KHNA30F-12	KHEA/KHNA30F-24
	VOLTAGE[V]		AC85 - 264 1 ϕ (Output derating is re		
	CURRENT[A]	ACIN 115V	0.45typ	0.50typ	0.55typ
INPUT	COMMENTIA	ACIN 230V	0.30typ	0.30typ	0.35typ
	FREQUENCY[Hz]		50 / 60 (45 - 440) or DC		
	EFFICIENCY[%]	ACIN 115V	84.0typ	87.0typ	88.5typ
	EFFICIENCY[%]	ACIN 230V	85.5typ	88.5typ	89.5typ
	INRUSH CURRENT[A]	ACIN 115V	18typ (Io=100%) (at cold start Ta=25		
	*1	ACIN 230V	35typ (lo=100%) (at cold start Ta=25	5℃)	
	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[m	ıV] *2	20max	48max	96max
	LOAD REGULATION[mV] *2	80max	100max	150max
		0 to +70°C	150max	150max	150max
	RIPPLE[mVp-p] *3	-20 - 0℃	300max	300max	300max
		lo=0 - 30%	300max *4	300max *4	300max *4
OUTPUT		0 to +70°C	180max	180max	180max
OUTPUT	RIPPLE NOISE[mVp-p] *3	-20 - 0°C	360max	360max	360max
		Io=0 - 30%	360max *4	360max *4	360max *4
	TEMPERATURE REQUIRATIONS	0 to +70°C	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	NG[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 recov	vers automatically *10	
CIRCUIT AND	OVERVOLTAGE PROTEC	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 50MΩ min (At Room Temperature)		
ISOLATION	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M Ω min (At Room Temperature)		
	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)		
	OPERATING TEMP., HUMID. AND A	ALTITUDE	-20 to +70°C (Required to Derating), 20 - 90%RH (Non condensing)		
ENVIRONMENT	STORAGE TEMP., HUMID. AND A	LTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)		
ENVIRONMENT	VIBRATION	*8	10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)		
	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis (Packing state)		
SAFETY AND	AGENCY APPROVALS (At only	AC input)	UL60950-1, C-UL(CSA60950-1), UL508 (NEC Class2 per UL1310), ANSI/ISA12.12.01, EN60950-1, Complies with DEN-AN		
NOISE REGULATIONS	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
HEGULATIONS	HARMONIC ATTENUATOR		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		

- *1 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 pairber 45
- Case size contains neither the umbo.

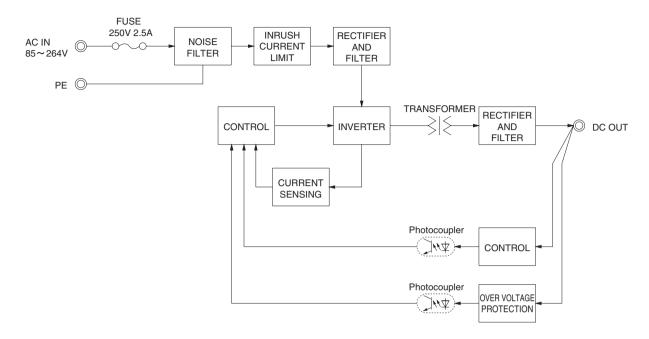
 Only as standard mounting orientation (A). Refer to the instruction manual 5.1. Willy as standard mounting orientation (A). Refer to the instruction manual 5.1.
 If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
 When two or more 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.
 To meet the specifications. Do not operate over-loaded condition.
 A sound may occur from power supply at light or peak loading.

KH-2





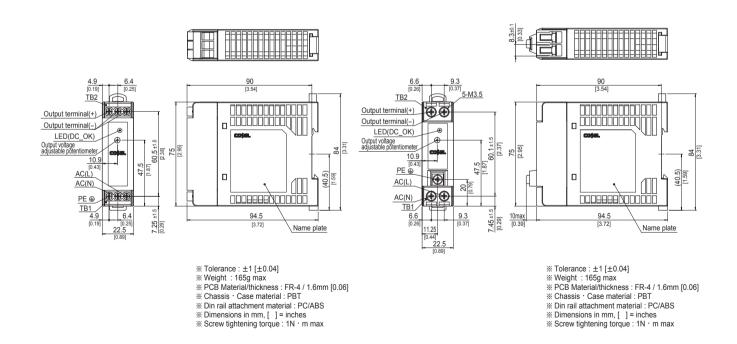
Block diagram



External view

<KHEA30F(Euro Style I/O Terminals)>

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



60









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 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

SPECIFICATIONS

	MODEL		KHEA/KHNA60F-12	KHEA/KHNA60F-24	
	VOLTAGE[V]		AC85 - 264 1 \(\phi \) (Output derating is required) or DC120 - 370		
	OUDDENTIAL	ACIN 115V	1.00typ	1.10typ	
	CURRENT[A]	ACIN 230V	0.60typ	0.70typ	
	FREQUENCY[Hz]		50 / 60 (45 - 440) or DC		
NPUT		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℃)		
	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	nV1 *2	48max	96max	
	LOAD REGULATION		100max	150max	
	3.32		200max	200max	
	RIPPLE[mVp-p] *3	-20 - 0°C	300max	300max	
			300max *4	300max *4	
		0 to +70℃	260max	260max	
UTPUT	RIPPLE NOISE[mVp-p] *3		360max	360max	
		lo=0 - 30%	360max *4	360max *4	
		0 to +70°C	120max	240max	
	TEMPERATURE REGULATION[mV]	-20 to +70℃	150max	290max	
	DRIFT[mV]	*5	48max	96max	
	START-UP TIME[ms]		200typ (ACIN 115V, Io=100%)	Olinax	
	HOLD-UP TIME[ms]		20typ (ACIN 115V, 10=100%)		
	OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		10.80 to 13.20	22.50 to 28.50	
	OUTPUT VOLTAGE SETT		12.00 to 12.48	24.00 to 24.96	
ROTECTION	OVERCURRENT PROTE			*10	
IRCUIT AND	OVERVOLTAGE PROTE		13.80 to 16.80	30.00 to 36.00	
THERS	DC OK LAMP	011011[1]	LED (Green)	00.00 to 00.00	
	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50N	MΩ min (At Room Temperature)	
OLATION	INPUT-PE		AC2,000V 1minute, Outoff current = 10mA, DC500V 50M Ω min (At Room Temperature)		
JOE ATTOM	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50M Ω min (At Room Temperature)		
	OPERATING TEMP., HUMID. AND	AI TITUDE	-20 to +70°C (Required to Derating), 20 - 90%RH (Non condensing)		
	STORAGE TEMP., HUMID.AND		-30 to +85°C, 20 - 90%RH (Non condensing)		
NVIRONMENT	VIBRATION	*8	10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)		
	IMPACT		196.1m/s² (20G), 11ms, once each X, Y and Z axis (Packing state)		
			UL60950-1, C-UL(CSA60950-1), UL508 (NEC Class2 per UL1310), ANSI/ISA12.12.01, EN60950-1,		
AFETY AND	AGENCY APPROVALS (At only	y AC input)	Complies with DEN-AN	1 0E1010), ANOI/10A12.12.01, EN00300 1,	
OISE	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B.	EN55022-B	
EGULATIONS	HARMONIC ATTENUA	ATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-in to		
	CASE SIZE	*7	32×90×90mm (W×H×D) [1.26×3.54×3.54 inches]		
OTHERS			7.1		
THERS	WEIGHT		270g max	270g max 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.

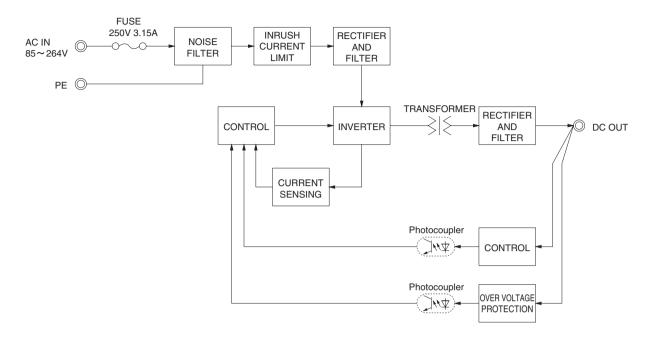
 In case of operating under 0°C ambient temperature, the value is two times of specification at 0 to 30% load factor.
- *5 Drift is the change in DC output for an eight hour period after a half-hour warm-up at 25°C, with the input voltage held constant at the rated input/output.
- *6 Please contact us about another class.
 *7 Case size contains pairber 45
- Case size contains neither the umbo.

 Only as standard mounting orientation (A). Refer to the instruction manual 5.1. When two or more units are operating it may not comply with the lEC61000-3-2.
 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.
 To meet the specifications. Do not operate over-loaded condition.
 A sound may occur from power supply at light or peak loading.

KH-4



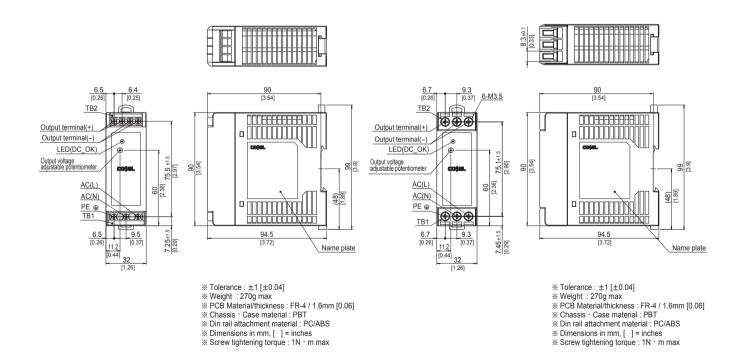
Block diagram



External view

<KHEA60F(Euro Style I/O Terminals)>

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



90









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 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

SPECIFICATIONS

	MODEL		KHEA/KHNA90F-12	KHEA/KHNA90F-24	
	VOLTAGE[V]		AC85 - 264 1 ϕ (Output derating is required) or DC88-	250 *10	
	OUDDENTIAL	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		
	(lo=100%)	ACIN 230V	0.86typ		
	INRUSH CURRENT[A]	ACIN 115V	18typ (Io=100%) (at cold start Ta=25°C)		
	*1 ACIN 230V		35typ (lo=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]	<u></u>	12	24	
	CURRENT[A]		6.8	3.8	
	PEAK CURRENT[A]		-	-	
	LINE REGULATION[n	nV1 *2	48max	96max	
	LOAD REGULATION		100max	150max	
			200max	200max	
	RIPPLE[mVp-p] *3	-20 - 0°C	300max	300max	
	TILL I EE[IIIVP-P]	lo=0 - 30%	300max *4	300max *4	
		0 to +70°C	260max	260max	
OUTPUT	RIPPLE NOISE[mVp-p] *3	-20 - 0°C	360max	360max	
	THEFT HOISE[IIIVP-P]		360max *4	360max *4	
		0 to +70°C	120max	240max	
	TEMPERATURE REGULATION[mV]	-20 to +70°C	150max	290max	
	DRIFT[mV]	*5	48max	96max	
	START-UP TIME[ms]		500typ (ACIN 115V, Io=100%)	Solliax	
			20typ (ACIN 115V, Io=100%)		
	HOLD-UP TIME[ms] OUTPUT VOLTAGE ADJUSTMENT RANGE[V]		10.80 to 13.20	22.50 to 28.50 (Fixed for option -E)	
	OUTPUT VOLTAGE SETT		12.00 to 12.48	24.00 to 24.96 (24.00 to 24.50 for option -E)	
	OVERCURRENT PROTE		Works over 105% of rating (101% for option -E), recover	1 /	
PROTECTION 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	CHON[V]	LED (Green)	30.00 to 30.00 (26.40 to 33.60 for option -E)	
	INPUT-OUTPUT			MO min (At Room Tomperature)	
ISOLATION	INPUT-PE		AC3,000V 1 minute, Cutoff current = 10mA, DC500V 50M Ω min (At Room Temperature)		
ISOLATION	OUTPUT-PE		AC2,000V 1 minute, Cutoff current = 10mA, DC500V 50M Ω min (At Room Temperature)		
	OPERATING TEMP., HUMID.AND	AI TITLIDE	AC500V 1minute, Cutoff current = 100mA, DC500V 50M Ω min (At Room Temperature) -20 to +70 $^{\circ}$ C (Required to Derating), 20 - 90%RH (Non condensing)		
			()	condensing)	
ENVIRONMENT	STORAGE TEMP., HUMID. AND A	*8	-30 to +85°C, 20 - 90%RH (Non condensing) 10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)		
	IMPACT	*0	196.1m/s² (20G), 11ms, X, Y and Z axis (Packing state)		
	IIVIPACI				
SAFETY AND	AGENCY APPROVALS (At only	y AC input)	UL60950-1, C-UL(CSA60950-1), EN60950-1, UL508, NEC Class2 (24V output only option -E), ANSI/ISA12.12.01 Complies with DEN-AN		
NOISE REGULATIONS	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B	3, EN55022-B	
neduLATIONS	HARMONIC ATTENU	ATOR	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		405g max		
	COOLING METHOD		Convection		
	COOLING WE I HUD			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.
- Please contact us about another class.
- 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.

 If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction propul 2.3.
- #\$9 If the overcurrent protection circuit operates continuously, the output voltage shut down. Heter to the instruction manual 2.3.

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

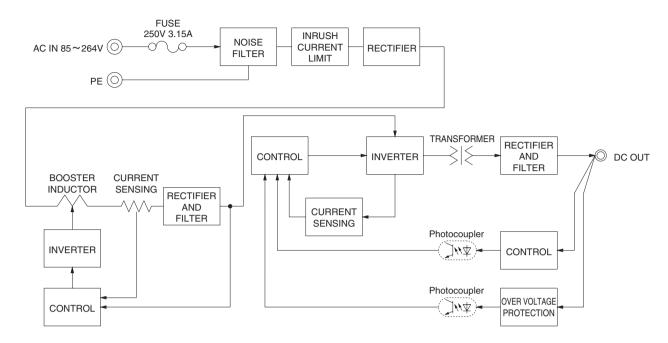
 * To meet the specifications. Do not operate over-loaded condition.

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





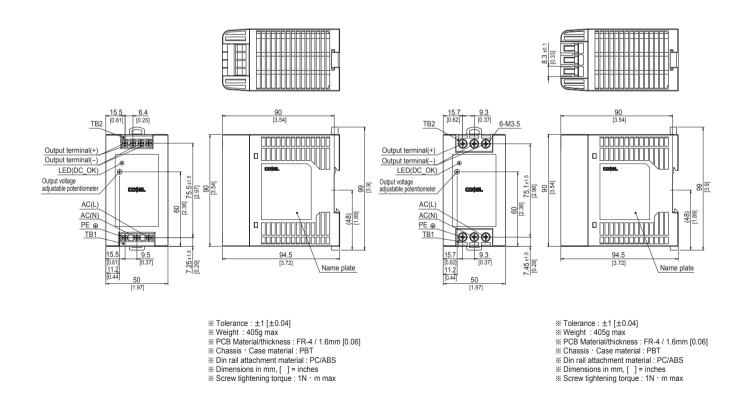
Block diagram



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

CDECIEIC ATIONS

	CATIONS				
	MODEL		KHEA / KHNA120F-24		
_ \	VOLTAGE[V]		AC85 - 264 1 \$\phi\$ or DC88 - 370 *10		
١,	CURRENT[A]	ACIN 115V	1.2typ		
Ľ	COMMENTIA	ACIN 230V	0.6typ		
L	FREQUENCY[Hz]		50 / 60 (45 - 66) or DC		
١.	EEEICIENCVI0/1	ACIN 115V	90typ		
IPUT '	EFFICIENCY[%]	ACIN 230V	92typ		
	POWER FACTOR	ACIN 115V	0.98typ		
L'	POWER FACTOR	ACIN 230V	0.93typ		
Ī	INRUSH CURRENT[A]	ACIN 115V	15typ (at cold start Ta=25°C)		
	*1	ACIN 230V	30typ (at cold start Ta=25°C)		
Ī	LEAKAGE CURRENT	[mA]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)		
1	VOLTAGE[V]		24		
	CURRENT[A]		5		
1	PEAK CURRENT[A]	*2	7.5		
ī	LINE REGULATION[n	ıV] *3	96max		
<u> </u>	LOAD REGULATION		150max *4		
		0 to +70℃	120max		
	RIPPLE[mVp-p] *5	-25 - 0°C	240max		
			240max *4		
		0 to +70°C	150max		
UTPUT ,	RIPPLE NOISE[mVp-p] *5	-25 - 0°C	300max		
		Io=0 - 30%	300max *4		
		0 to +70°C	240max *4		
1	TEMPERATURE REGULATION[mV]	-25 to +70°C	360max *4		
h	DRIFT[mV]	*6	96max		
-	START-UP TIME[ms]		750max (ACIN 115V, Io=100%)		
	HOLD-UP TIME[ms]		20typ (ACIN 115V, Io=100%)		
H	OUTPUT VOLTAGE ADJUSTMENT F	RANGEIVI	22.5 to 28.5		
<u> </u>	OUTPUT VOLTAGE SETT		24.0±1.0%		
	OVERCURRENT PROTE		Works over 101% of peak current and recovers automatically		
_	OVERVOLTAGE PROTE		30.0 to 36.0		
DOTECTION -	REMOTE ON/OFF (RO		Provided		
IRCHIT AND ⊢	DC_OK LAMP	•)	LED (Green)		
IDERS ⊢	ALARM LAMP		LED (Red)		
<u> </u>			,		
	DC_OK CONTACT		Relay contact 30VDC 1A max, 30VAC 0.5A max (resistive load) (Only KHEA)		
<u> </u>	INPUT-OUTPUT		AC3,000V 1 minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
COLATION ⊢	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M Ω min (At Room Temperature)		
⊢	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50M Ω min (At Room Temperature)		
	OUTPUT-RC, DC_OK	ALTITUDE	AC500V 1minute, Cutoff current = 100mA, DC500V 50M Ω min (At Room Temperature)		
⊢	OPERATING TEMP., HUMID. AND		-25 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Required to Derating)		
UVIRONMENT ⊢	STORAGE TEMP.,HUMID.AND A		-40 to +85°C, 20 - 90%RH (Non condensing)		
	VIBRATION	*9	10 - 55Hz, 19.6m/s² (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)		
	IMPACT		196.1m/s ² (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		
DISE		DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1		
GULATIONS	CONDUCTED NOISE		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]		
-	WEIGHT		580g max		
10	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.

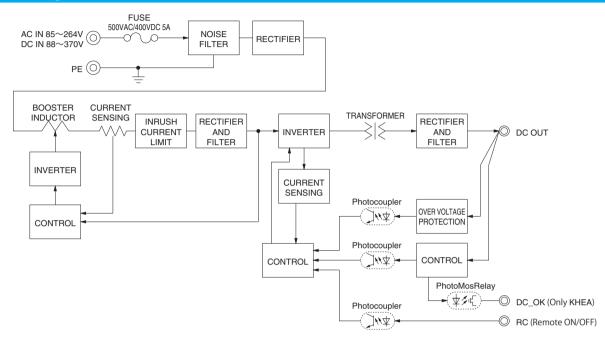
- Only as standard mounting orientation (A). Refer to the instruction manual 5.1 If install other than standard mounting orientation (A), please fix the power
- It install other than standard mounting orientation (A), please if it the powe supply for withstand the vibration and impact.

 *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.

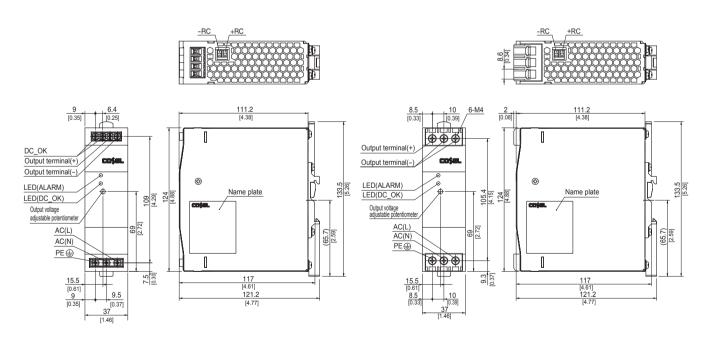
Block diagram



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)

SPECIFICATIONS

01 2011	CATIONS		
	MODEL		KHEA / KHNA240F-24
	VOLTAGE[V]		AC85 - 264 1 φ or DC88 - 370 *10
	CURRENT[A]	ACIN 115V	2.3typ
		ACIN 230V	1.2typ
	FREQUENCY[Hz]		50 / 60 (45 - 66) or DC
	EFFICIENCY[%]	ACIN 115V	92typ
INPUT	21110121101[70]	ACIN 230V	94typ
	POWER FACTOR	ACIN 115V	0.98typ
	TOWERTAGION	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	[mA]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC60950-1 and DEN-AN)
	VOLTAGE[V]		24
	CURRENT[A]		10
	PEAK CURRENT[A]	*2	15
	LINE REGULATION[n	1V] *3	96max
	LOAD REGULATION[mV] *3	150max *4
		0 to +70℃	120max
	RIPPLE[mVp-p] *5	-25 - 0 ℃	240max
		lo=0 - 30%	240max *4
OUTDUT		0 to +70°C	150max
OUTPUT	RIPPLE NOISE[mVp-p] *5	-25 - 0°C	300max
		lo=0 - 30%	300max *4
	TEMPERATURE REQUIRATIONSVC	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 SETT	ING[V]	24.0±1.0%
	OVERCURRENT PROTE	CTION	Works over 101% of peak current and recovers automatically
	OVERVOLTAGE PROTEC	CTION[V]	30.0 to 36.0
PROTECTION	REMOTE ON/OFF (RO	2)	Provided
CIRCUIT AND OTHERS	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 50M Ω min (At Room Temperature)
ICOL ATION	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M Ω min (At Room Temperature)
ISOLATION	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50M Ω min (At Room Temperature)
	OUTPUT-RC, DC_OK		AC500V 1minute, Cutoff current = 100mA, DC500V 50M Ω min (At Room Temperature)
	OPERATING TEMP., HUMID. AND	ALTITUDE	-25 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Required to Derating)
ENIVIDONMENT	STORAGE TEMP., HUMID. AND A	ALTITUDE	-40 to +85°C, 20 - 90%RH (Non condensing)
ENVIRONMENT	VIBRATION	*9	10 - 55Hz, 19.6m/s ² (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)
	IMPACT		196.1m/s ² (20G), 11ms, once each X, Y and Z axis (Packing state)
	ACENOV APPROVALO	AC input	UL60950-1, C-UL (CSA60950-1), EN60950-1, UL508, ANSI/ISA12.12.01, ATEX, GL Complies with DEN-AN
SAFETY AND	AGENCY APPROVALS	DC input	UL60950-1, C-UL (CSA60950-1), EN60950-1
NOISE	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B
REGULATIONS	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]
OTHERS	WEIGHT		900g 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.

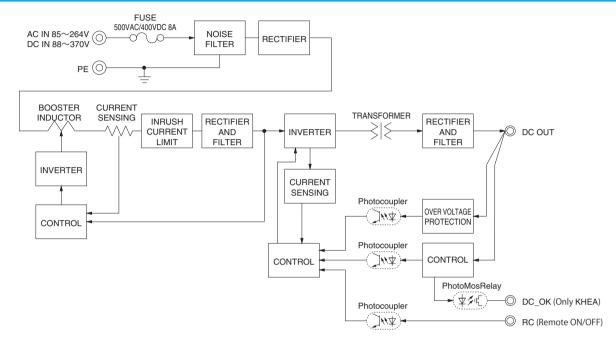
- Only as standard mounting orientation (A). Refer to the instruction manual 5.1 If install other than standard mounting orientation (A), please fix the power
- It install other than standard mounting orientation (A), please if it the powe supply for withstand the vibration and impact.

 *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.

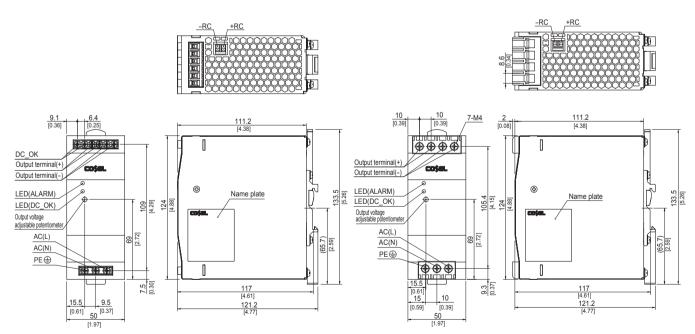
Block diagram



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

SPECIFICATIONS

	MODEL		KHEA / KHNA480F-24	KHEA / KHNA480F-48	
	VOLTAGE[V]		AC85 - 264 1 ϕ (Output derating is required) or DC88 -	350 *10	
	CURRENT[A]	ACIN 115V	4.6typ		
	ACIN 230V		2.3typ		
	FREQUENCY[Hz]		50 / 60 (45 - 66) or DC		
	EEEIOJENOVIO/3	ACIN 115V			
INPUT	EFFICIENCY[%]	ACIN 230V	94typ		
		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	[mA]	0.75 / 1.5max (ACIN 100V / 240V 60Hz, Io=100%, Acc	cording to IEC60950-1 and DEN-AN)	
	VOLTAGE[V]		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	
			120max	120max	
	RIPPLE[mVp-p] *4	-25 - 0°C	240max	240max	
		lo=0 - 30%		750max	
		0 to +70°C	150max	150max	
OUTPUT	RIPPLE NOISE[mVp-p] *4	-25 - 0°C	300max	300max	
	Tim T EE HOIOE[IIII P P]	lo=0 - 30%	600max	750max	
		0 to +70°C	240max	480max	
	TEMPERATURE REGULATION[mV]			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 SETTING[V]		24.0±1.0%	48.0±1.0%	
	OVERCURRENT PROTE		Works over 101% of peak current and recovers automatically		
	OVERVOLTAGE PROTECTION[V]		30.0 to 36.0	57.6 to 67.2	
PROTECTION	REMOTE ON/OFF (RO		Provided	07.0 to 07.2	
CIRCUIT AND	DC_OK LAMP	<i>J</i> ,	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 50M Ω min (At Room Temperature)		
	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50M Ω min (At Room Temperature)		
ISOLATION	OUTPUT-PE		AC5,000V 1minute, Cutoff current = 100mA, DC500V 50M Ω min (At Room Temperature)		
	OUTPUT-RC, DC_OK		AC500V 1minute, Cutoff current = 100mA, DC500V 50M Ω min (At Room Temperature)		
	OPERATING TEMP., HUMID. AND		-25 to +70°C, 20 - 90%RH (Non condensing), Type test	· · · · · · · · · · · · · · · · · · ·	
	STORAGE TEMP., HUMID.AND		-40 to +85°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Required to Defating)		
ENVIRONMENT	VIBRATION	*8	, (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)		
	i	AC input		SI/ISA12.12.01, ATEX, GL (Only 24V) Complies with DEN-AN	
SAFETY AND	AGENCY APPROVALS	<u> </u>	UL60950-1, C-UL (CSA60950-1), EN60950-1	And The Text of Area, are formy 247, compiles with Delivative	
NOISE	CONDUCTED NOISE	Do input	UL60950-1, C-UL (CSA60950-1), 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		, LINOULL D		
	CASE SIZE	*7	70×124×117mm (W×H×D) [2.76×4.88×4.61 inche	[pc	
OTHERS	WEIGHT	₹/	1,200g max	70]	
OTHERS			, ,		
	COOLING METHOD		Convection		

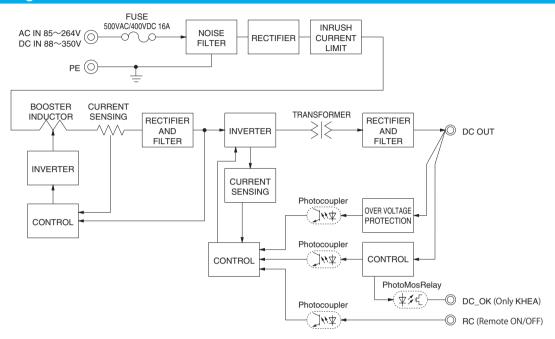
KH series C



- 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.

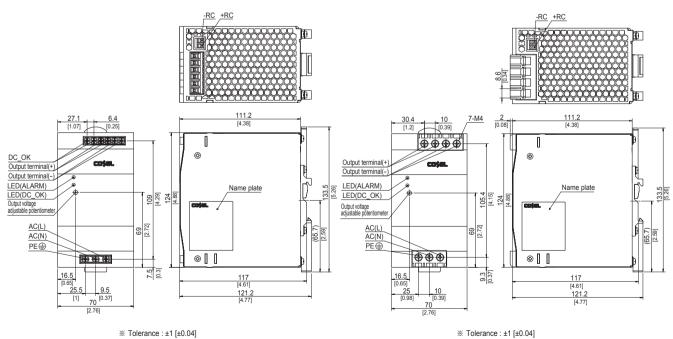
Block diagram



External view

<KHEA480F(Euro Style I/O Terminals)>

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



- * 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

- * 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