



KH-series



Feature

For DIN (35mm) rail products
Wide operating ambient temperature range
I/O terminal has 2 types, Euro Style and Barrier Blocks Style
Built in overcurrent protection, overvoltage protection circuits

- KHEA/KHNA30F~90F
Low power consumption at no load
Complies with SEMI F-47 (Derating is required)
- KHEA/KHNA120F~480F
Built in remote ON/OFF
Built in signal output for confirming output voltage
Complies with SEMI F-47

Safety agency approvals

EN62368-1, UL508, ATEX (All models)
UL60950-1, C-UL (CSA60950-1)
(KHEA/KHNA30F~120F, KHEA/KHNA480F)
UL62368-1, C-UL (CSA62368-1) (KHEA/KHNA240)
UL121201 (KHEA/KHNA30F~240F)
ANSI/ISA12.12.01 (KHEA/KHNA480F)
Complies with DEN-AN

5-year warranty (refer to Instruction Manual)

CE marking

Low Voltage Directive
RoHS Directive

UKCA marking

Electrical Equipment Safety Regulations
RoHS Regulations

EMI

Complies with FCC-B, CISPR22-B, EN55011-B, EN55022-B, VCCI-B

EMS Compliance : EN61204-3, EN61000-6-2

EN61000-4-2
EN61000-4-3
EN61000-4-4
EN61000-4-5
EN61000-4-6
EN61000-4-8
EN61000-4-11

KHEA/KHNA30F

KH ☐ A 30 F - ☐ - ☐

① ② ③ ④ ⑤ ⑥



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



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.

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

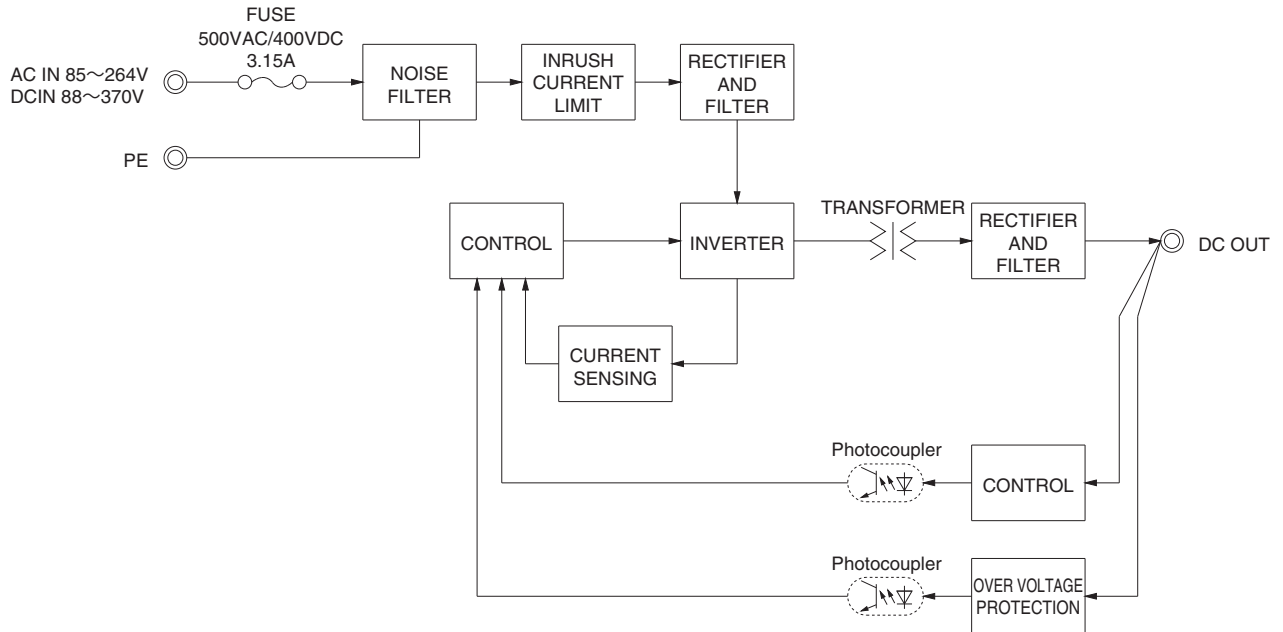
SPECIFICATIONS

	MODEL		KHEA/KHNA30F-5	KHEA/KHNA30F-12	KHEA/KHNA30F-24
INPUT	VOLTAGE[V]		AC85 - 264 1 φ (Refer to “Derating”) or DC88 - 370 *11		
	CURRENT[A]	ACIN 115V ACIN 230V	0.45typ 0.30typ	0.50typ 0.30typ	0.55typ 0.35typ
	FREQUENCY[Hz]		50 / 60 (45 - 440) or DC		
	EFFICIENCY[%]	ACIN 115V ACIN 230V	84.0typ 85.5typ	87.0typ 88.5typ	88.5typ 89.5typ
	INRUSH CURRENT[A]	ACIN 115V *1 ACIN 230V	18typ (Io=100%) (at cold start Ta=25℃) 35typ (Io=100%) (at cold start Ta=25℃)		
	LEAKAGE CURRENT[ma]		0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)		
	OUTPUT	VOLTAGE[V]		5	12
CURRENT[A]		5.0	2.3	1.3	
PEAK CURRENT[A]		-	-	-	
LINE REGULATION[mV] *2		20max	48max	96max	
LOAD REGULATION[mV] *2		80max	100max	150max	
RIPPLE[mVp-p] *3		0 to +70℃	150max	150max	150max
		-20 - 0℃	300max	300max	300max
		Io=0 - 30%	300max *4	300max *4	300max *4
RIPPLE NOISE[mVp-p] *3		0 to +70℃	180max	180max	180max
		-20 - 0℃	360max	360max	360max
		Io=0 - 30%	360max *4	360max *4	360max *4
TEMPERATURE REGULATION[mV]		0 to +70℃	50max	120max	240max
		-20 to +70℃	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 SETTING[V]		5.00 to 5.15	12.00 to 12.48	24.00 to 24.96	
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION		Works over 105% of rating and recovers automatically *10		
	OVERVOLTAGE PROTECTION[V]		6.30 to 7.60	13.80 to 16.80	30.00 to 36.00
	DC_OK LAMP		LED (Green)		
ISOLATION	INPUT-OUTPUT		AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	INPUT-PE		AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)		
	OUTPUT-PE		AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)		
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE		-20 to +70℃, 20 - 90%RH (Non condensing), Type tested for -40℃ start-up (Refer to “Derating”)		
	STORAGE TEMP., HUMID. AND ALTITUDE		-30 to +85℃, 20 - 90%RH (Non condensing)		
	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 NOISE REGULATIONS	AGENCY APPROVALS	AC input DC input	UL60950-1, C-UL (CSA60950-1), EN62368-1, UL508 (NEC Class2 per UL1310), UL121201, ATEX, Complies with DEN-AN * UL60950-1, C-UL (CSA60950-1), EN62368-1		
	CONDUCTED NOISE		Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B		
	HARMONIC ATTENUATOR		Complies with IEC61000-3-2 (Class A) *6 (Not built-in to active filter) *9		
OTHERS	CASE SIZE *7		22.5×75×90mm (W×H×D) [0.89×2.95×3.54 inches]		
	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 excluded.
*2 Please contact us about dynamic load and input response.
*3 This is the value that measured on measuring board with capacitor of 22μF and 0.1μF at 150mm from output terminal.
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 1.7.
Ripple and ripple noise spec is change at Io=0 to 30% by burst operation.
*4 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 neither the umbo.
*8 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method". If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
*9 When two or more units are operating it may not comply with the IEC61000-3-2.
*10 If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 1.3.
*11 Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1%/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.

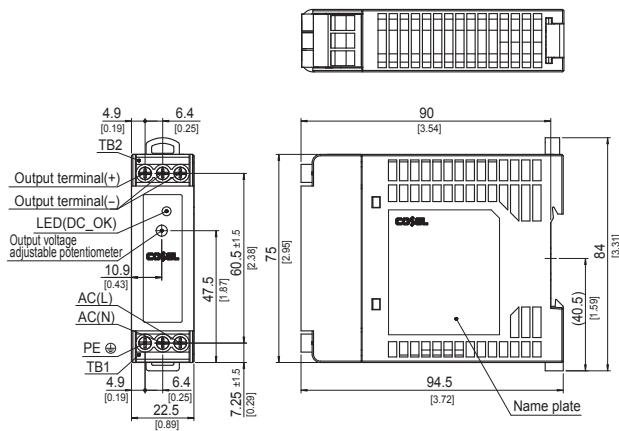
Block diagram



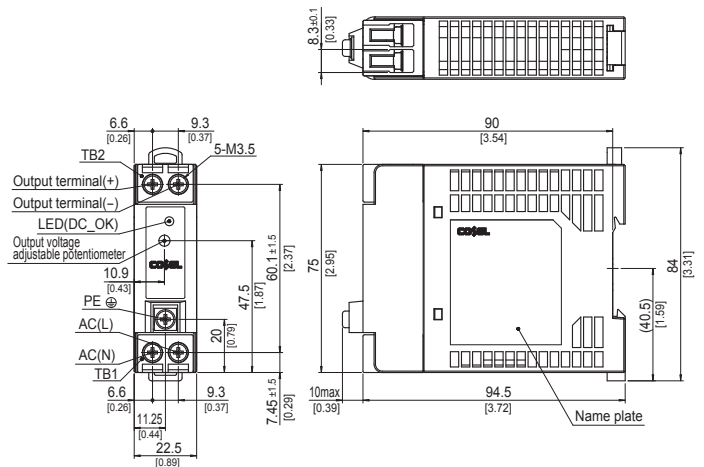
External view

<KHEA30F(Euro Style I/O Terminals)>

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



- ※ Tolerance : ± 1 [± 0.04]
- ※ Weight : 165g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [] = inches
- ※ Screw tightening torque : 1N · m max



- ※ Tolerance : ± 1 [± 0.04]
- ※ Weight : 165g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [] = inches
- ※ Screw tightening torque : 1.1N · m max

KHEA/KHNA60F

KH ☐ A 60 F - ☐ - ☐

① ② ③ ④ ⑤ ⑥



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



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.

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

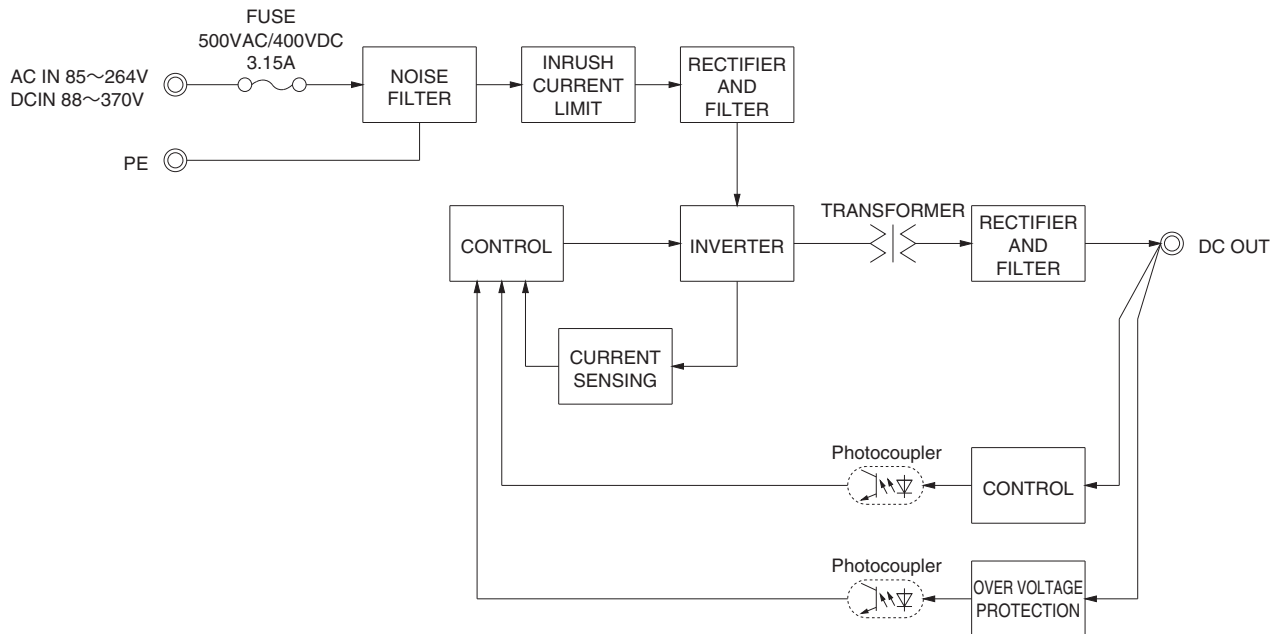
SPECIFICATIONS

	MODEL	KHEA/KHNA60F-12	KHEA/KHNA60F-24
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating") or DC88 - 370 *11	
	CURRENT[A]	ACIN 115V 1.00typ ACIN 230V 0.60typ	1.10typ 0.70typ
	FREQUENCY[Hz]	50 / 60 (45 - 440) or DC	
	EFFICIENCY[%]	ACIN 115V 87.0typ ACIN 230V 88.0typ	89.0typ 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, Io=100%, According to IEC62368-1 and DEN-AN)	
OUTPUT	VOLTAGE[V]	12	24
	CURRENT[A]	4.5	2.5
	PEAK CURRENT[A]	-	-
	LINE REGULATION[mV]	*2 48max	96max
	LOAD REGULATION[mV]	*2 100max	150max
	RIPPLE[mVp-p]	0 to +70°C 200max -20 - 0°C 300max Io=0 - 30% 300max *4	200max 300max 300max *4
	RIPPLE NOISE[mVp-p]	0 to +70°C 260max -20 - 0°C 360max Io=0 - 30% 360max *4	260max 360max 360max *4
	TEMPERATURE REGULATION[mV]	0 to +70°C 120max -20 to +70°C 150max	240max 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 SETTING[V]	12.00 to 12.48	24.00 to 24.96
PROTECTION CIRCUIT AND OTHERS	OVERCURRENT PROTECTION	Works over 105% of rating and recovers automatically *10	
	OVERVOLTAGE PROTECTION[V]	13.80 to 16.80	30.00 to 36.00
	DC_OK LAMP	LED (Green)	
ISOLATION	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)	
	INPUT-PE	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)	
	OUTPUT-PE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)	
ENVIRONMENT	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing) , Type tested for -40°C start-up (Refer to "Derating")	
	STORAGE TEMP., HUMID. AND ALTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)	
	VIBRATION	*8 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)	
SAFETY AND NOISE REGULATIONS	AGENCY APPROVALS	AC input UL60950-1, C-UL (CSA60950-1), EN62368-1, UL508 (NEC Class2 per UL1310), UL121201, ATEX, Complies with DEN-AN * DC input UL60950-1, C-UL (CSA60950-1), EN62368-1	
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B	
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *6 (Not built-in to 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	

- *1 The value is primary surge. The current of input surge to a built-in EMI/EMC Filter(0.2ms or less)is excluded.
*2 Please contact us about dynamic load and input response.
*3 This is the value that measured on measuring board with capacitor of 22μF and 0.1μF at 150mm from output terminal.
Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103). Please refer to the instruction manual 1.7.
Ripple and ripple noise spec is change at Io=0 to 30% by burst operation.
*4 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 neither the umbo.
*8 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method".
If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
*9 When two or more units are operating it may not comply with the IEC61000-3-2.
*10 If the overcurrent protection circuit operates continuously, the output voltage shut down. Refer to the instruction manual 1.3.
*11 Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1%/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.

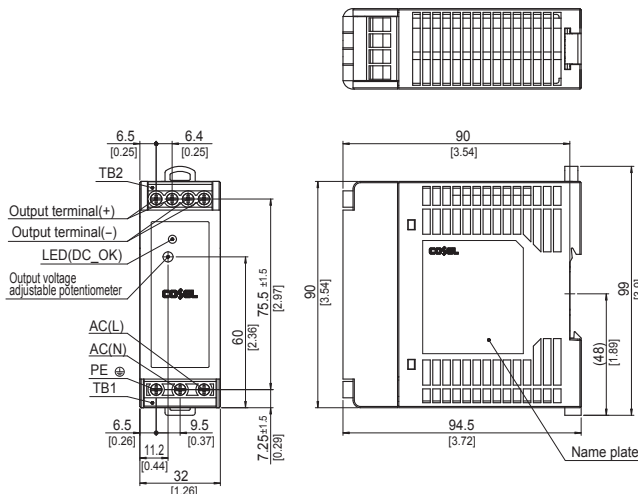
Block diagram



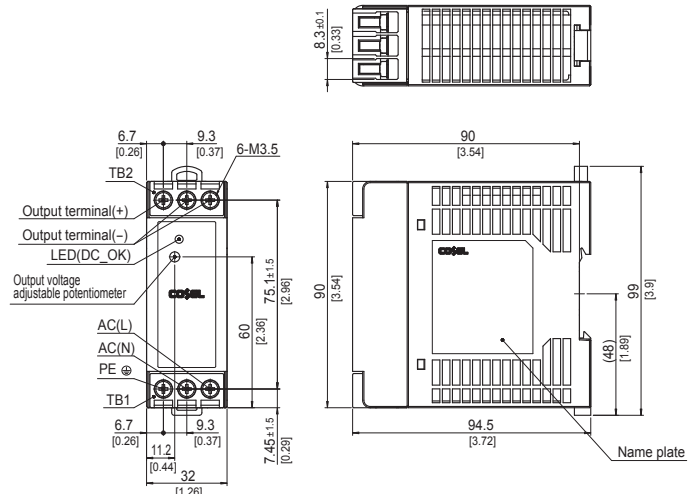
External view

<KHEA60F(Euro Style I/O Terminals)>

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



- ※ Tolerance : ± 1 [± 0.04]
- ※ Weight : 270g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [] = inches
- ※ Screw tightening torque : 1N · m max



- ※ Tolerance : ± 1 [± 0.04]
- ※ Weight : 270g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [] = inches
- ※ Screw tightening torque : 1.1N · m max

KHEA/KHNA90F

KH ☐ A 90 F - ☐ - ☐

① ② ③ ④ ⑤ ⑥



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



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.

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

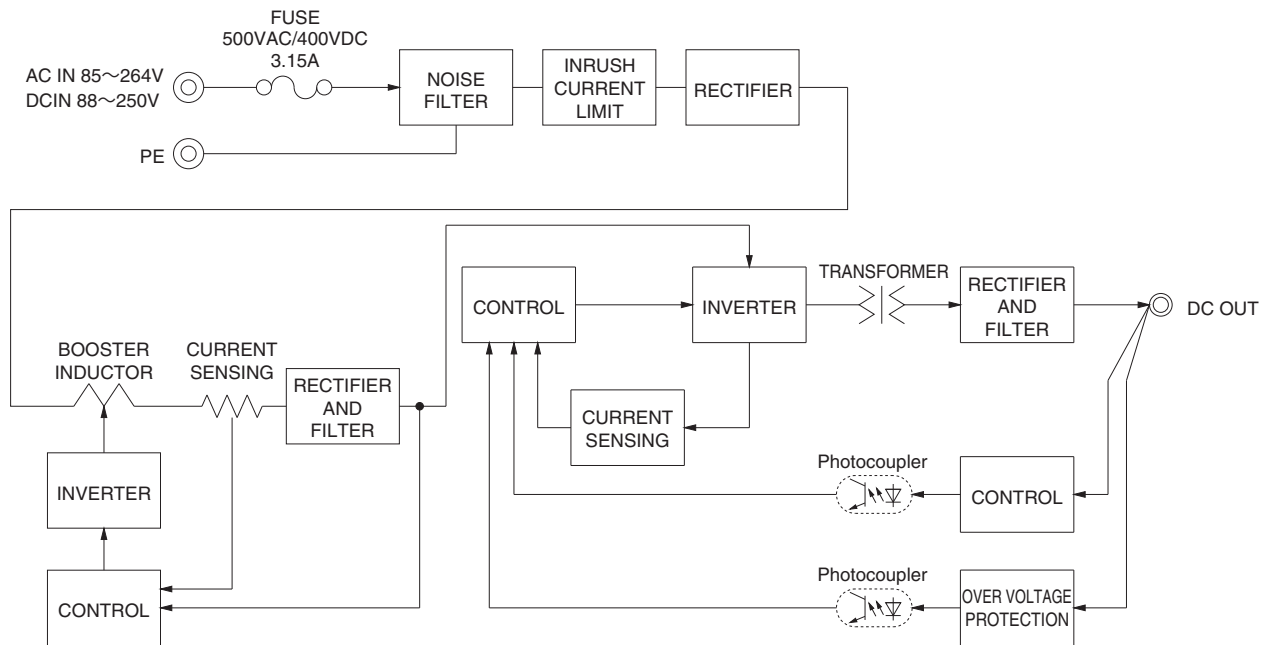
SPECIFICATIONS

	MODEL	KHEA/KHNA90F-12	KHEA/KHNA90F-24
INPUT	VOLTAGE[V]	AC85 - 264 1 φ (Refer to "Derating") or DC88-250 *10	
	CURRENT[A]	ACIN 115V	0.85typ
		ACIN 230V	0.45typ
	FREQUENCY[Hz]	50 / 60 (45 - 66) or DC	
	EFFICIENCY[%]	ACIN 115V	87.0typ
		ACIN 230V	88.0typ
	POWER FACTOR (Io=100%)	ACIN 115V	0.98typ
		ACIN 230V	0.86typ
	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, Io=100%, According to IEC62368-1 and DEN-AN)	
OUTPUT	VOLTAGE[V]	12	24
	CURRENT[A]	6.8	3.8
	PEAK CURRENT[A]	-	-
	LINE REGULATION[mV]	*2 48max	96max
	LOAD REGULATION[mV]	*2 100max	150max
	RIPPLE[mVp-p]	0 to +70°C	200max
		-20 - 0°C	300max
		Io=0 - 30%	300max *4
	RIPPLE NOISE[mVp-p]	0 to +70°C	260max
		-20 - 0°C	360max
		Io=0 - 30%	360max *4
	TEMPERATURE REGULATION[mV]	0 to +70°C	120max
		-20 to +70°C	150max
	DRIFT[mV]	*5 48max	96max
	START-UP TIME[ms]	500typ (ACIN 115V, Io=100%)	
	HOLD-UP TIME[ms]	20typ (ACIN 115V, Io=100%)	
PROTECTION CIRCUIT AND OTHERS	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)
	OVERCURRENT PROTECTION	Works over 105% of rating (101% for option -E), recovers automatically *9	
	OVERVOLTAGE PROTECTION[V]	13.80 to 16.80	30.00 to 36.00 (26.40 to 33.60 for option -E)
ISOLATION	DC_OK LAMP	LED (Green)	
	INPUT-OUTPUT	AC3,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)	
	INPUT-PE	AC2,000V 1minute, Cutoff current = 10mA, DC500V 50MΩ min (At Room Temperature)	
ENVIRONMENT	OUTPUT-PE	AC500V 1minute, Cutoff current = 100mA, DC500V 50MΩ min (At Room Temperature)	
	OPERATING TEMP., HUMID. AND ALTITUDE	-20 to +70°C, 20 - 90%RH (Non condensing), Type tested for -40°C start-up (Refer to "Derating")	
	STORAGE TEMP., HUMID. AND ALTITUDE	-30 to +85°C, 20 - 90%RH (Non condensing)	
	VIBRATION	*8 10 - 55Hz, 19.6m/s ² (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)	
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s ² (20G), 11ms, X, Y and Z axis (Packing state)	
	AGENCY APPROVALS	AC input	UL60950-1, C-UL (CSA60950-1), EN62368-1, UL508, NEC Class2 (24V output only option -E), UL121201, ATEX, Complies with DEN-AN
		DC input	UL60950-1, C-UL (CSA60950-1), EN62368-1
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B	
OTHERS	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]	
	WEIGHT	405g 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 excluded.
*2 Please contact us about dynamic load and input response.
*3 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 1.7.
Ripple and ripple noise spec is change at Io=0 to 30% by burst operation.
*4 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.
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*8 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method". If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
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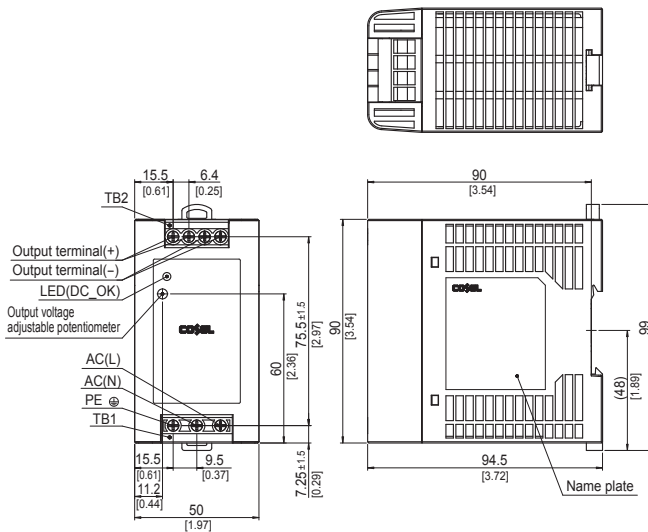
Block diagram



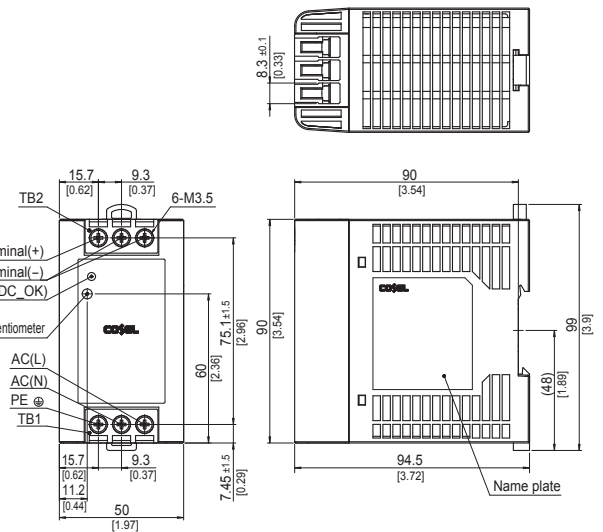
External view

<KHEA90F(Euro Style I/O Terminals)>

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



- ※ Tolerance : ± 1 [± 0.04]
- ※ Weight : 405g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [] = inches
- ※ Screw tightening torque : 1N · m max



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- ※ Weight : 405g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis · Case material : PBT
- ※ Din rail attachment material : PC/ABS
- ※ Dimensions in mm, [] = inches
- ※ Screw tightening torque : 1.1N · m max

KHEA/KHNA120F

KH ☐ A -120 F -24 - ☐

① ② ③ ④ ⑤ ⑥



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



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.

- ① Series name
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KHNA : Barrier blocks style I/O terminals
- ② Single 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)

SPECIFICATIONS

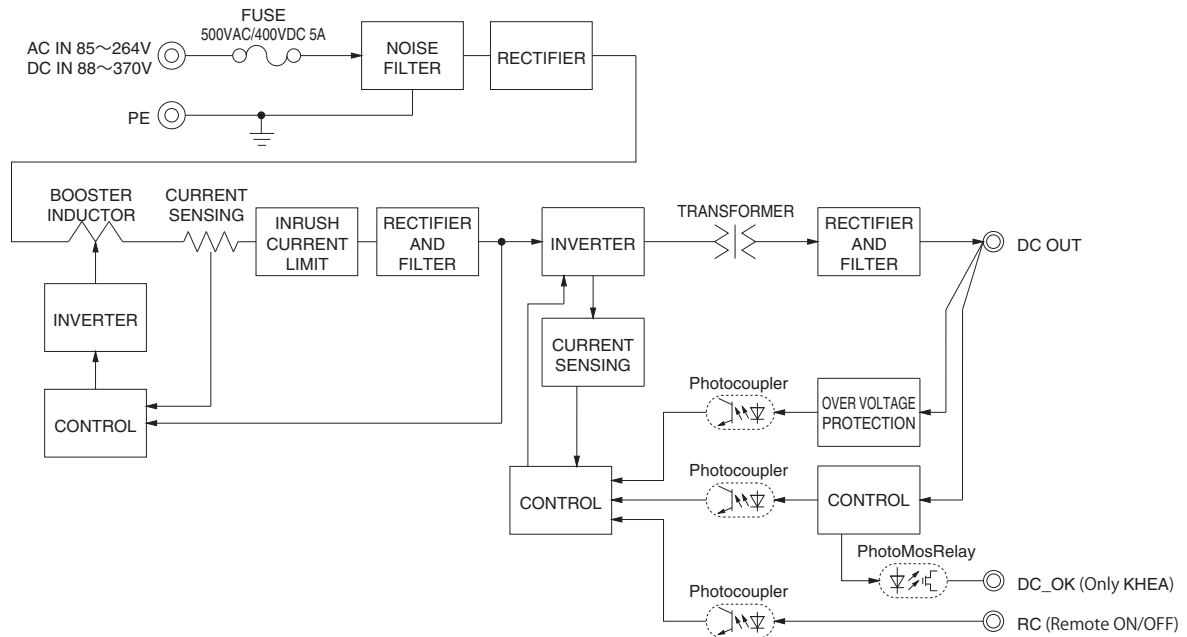
	MODEL	KHEA / KHNA120F-24
INPUT	VOLTAGE[V]	AC85 - 264 1 ϕ or DC88 - 370 *10
	CURRENT[A]	ACIN 115V 1.2typ
		ACIN 230V 0.6typ
	FREQUENCY[Hz]	50 / 60 (45 - 66) or DC
	EFFICIENCY[%]	ACIN 115V 90typ
		ACIN 230V 92typ
	POWER FACTOR	ACIN 115V 0.98typ
		ACIN 230V 0.93typ
	INRUSH CURRENT[A]	ACIN 115V 15typ (at cold start Ta=25°C)
		*1 ACIN 230V 30typ (at cold start Ta=25°C)
	LEAKAGE CURRENT[ma]	0.45 / 0.75max (ACIN 100V / 240V 60Hz, Io=100%, According to IEC62368-1 and DEN-AN)
OUTPUT	VOLTAGE[V]	24
	CURRENT[A]	5
	PEAK CURRENT[A] *2	7.5
	LINE REGULATION[mV] *3	96max
	LOAD REGULATION[mV] *3	150max *4
	RIPPLE[mVp-p] *5	0 to +70°C 120max
		-25 - 0°C 240max
	RIPPLE NOISE[mVp-p] *5	Io=0 - 30% 240max *4
		0 to +70°C 150max
		-25 - 0°C 300max
	TEMPERATURE REGULATION[mV]	Io=0 - 30% 300max *4
		0 to +70°C 240max *4
		-25 to +70°C 360max *4
	DRIFT[mV] *6	96max
PROTECTION CIRCUIT AND OTHERS	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 SETTING[V]	24.0 $\pm$ 1.0%
	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically
	OVERVOLTAGE PROTECTION[V]	30.0 to 36.0
ISOLATION	REMOTE ON/OFF (RC)	Provided
	DC_OK LAMP	LED (Green)
	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)
ENVIRONMENT	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	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 (Refer to "Derating")
SAFETY AND NOISE REGULATIONS	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 90%RH (Non condensing)
	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)
OTHERS	AGENCY APPROVALS	AC input UL60950-1, C-UL (CSA60950-1), EN62368-1, UL508, UL121201, ATEX, GL, Complies with DEN-AN
		DC input UL60950-1, C-UL (CSA60950-1), EN62368-1
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *7
	CASE SIZE *8	37 $\times$ 124 $\times$ 117mm (W $\times$ H $\times$ D) [1.46 $\times$ 4.88 $\times$ 4.61 inches]
	WEIGHT	580g 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 excluded.
- *2 Refer to 2, instruction manual.
- *3 Please contact us about dynamic load and input response.
- *4 The output voltage is below 23.5V, the value is equal to three times of the specification.
- *5 This is the value that measured on measuring board with capacitor of 22 μ F and 0.1 μ F at 150mm from output terminal.

- Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).
- *6 Please refer to the instruction manual 1.7.
- *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.
- *8 Please contact us about another class.
- *9 Case size contains neither the umbo.

- *9 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method".
- If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
- *10 Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1%/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.

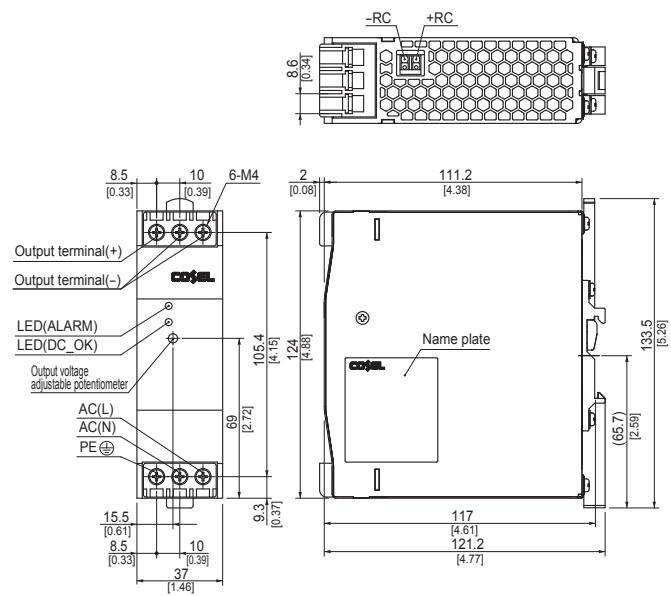
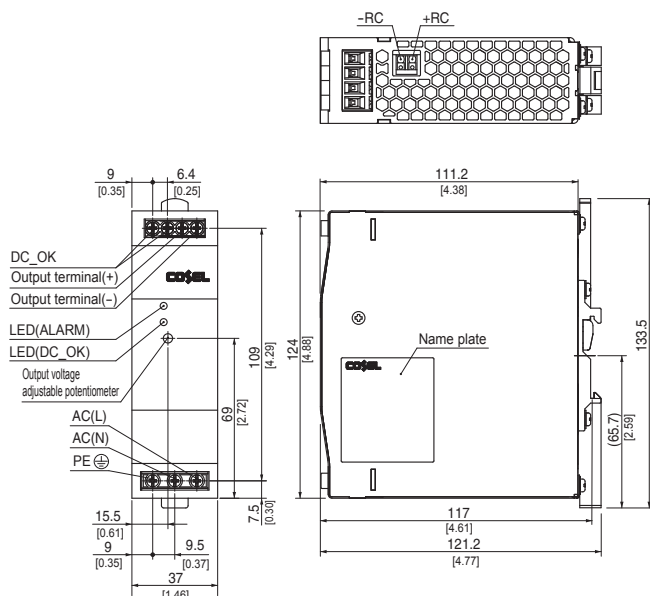
Block diagram



External view

<KHEA120F(Euro Style I/O Terminals)>

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



- ※ 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

KHEA/KHNA240F

KH ☐ A -240 F -24 - ☐

① ② ③ ④ ⑤ ⑥



Example recommended EMI/EMC filter
NAC-06-472-D



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.

- ① Series name
KHE : Euro style I/O terminals
KHN : Barrier blocks style
I/O terminals
② Single 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

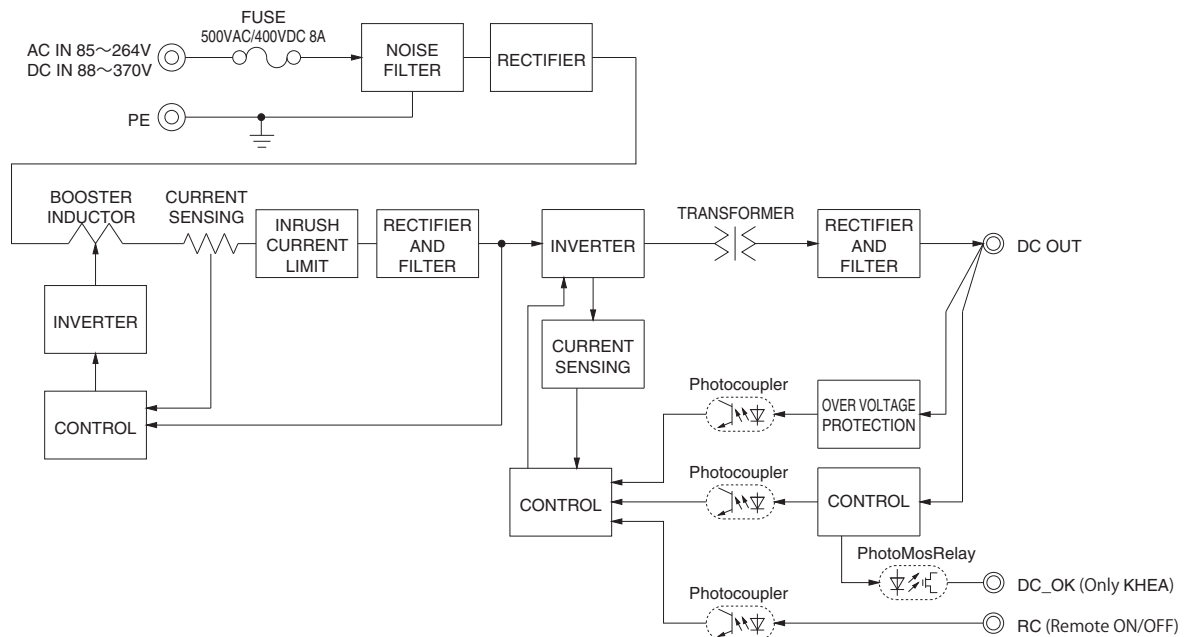
	MODEL	KHEA / KHNA240F-24	
	VOLTAGE[V]	AC85 - 264 1 ϕ or DC88 - 370 *10	
INPUT	CURRENT[A]	ACIN 115V	2.3typ
		ACIN 230V	1.2typ
	FREQUENCY[Hz]	50 / 60 (45 - 66) or DC	
	EFFICIENCY[%]	ACIN 115V	92typ
		ACIN 230V	94typ
	POWER FACTOR	ACIN 115V	0.98typ
		ACIN 230V	0.93typ
	INRUSH CURRENT[A]	ACIN 115V	20typ (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 IEC62368-1 and DEN-AN)	
OUTPUT	VOLTAGE[V]	24	
	CURRENT[A]	10	
	PEAK CURRENT[A]	*2	15
	LINE REGULATION[mV]	*3	96max
	LOAD REGULATION[mV]	*3	150max *4
		0 to +70°C	120max
		-25 - 0°C	240max
	RIPPLE[mVp-p]	Io=0 - 30%	240max *4
		0 to +70°C	150max
		-25 - 0°C	300max
	RIPPLE NOISE[mVp-p]	Io=0 - 30%	300max *4
		0 to +70°C	240max *4
		-25 to +70°C	360max *4
	TEMPERATURE REGULATION[mV]		
PROTECTION CIRCUIT AND OTHERS	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 SETTING[V]	24.0 $\pm$ 1.0%	
	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically	
	OVERVOLTAGE PROTECTION[V]	30.0 to 36.0	
	REMOTE ON/OFF (RC)	Provided	
ISOLATION	DC_OK LAMP	LED (Green)	
	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)	
ENVIRONMENT	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 (Refer to "Derating")	
	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 90%RH (Non condensing)	
	VIBRATION	*9	10 - 55Hz, 19.6m/s ² (2G), 3minutes period, 60 minutes along Z axis (Non operating, mounted on DIN Rail)
SAFETY AND NOISE REGULATIONS	IMPACT	196.1m/s ² (20G), 11ms, once each X, Y and Z axis (Packing state)	
	AGENCY APPROVALS	AC input	UL62368-1, C-UL (equivalent to CAN/CSA-C22.2 No. 62368-1), EN62368-1, UL508, UL121201, ATEX, GL, Complies with DEN-AN
		DC input	UL62368-1, C-UL (equivalent to CAN/CSA-C22.2 No. 62368-1), EN62368-1
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B	
	HARMONIC ATTENUATOR	Complies with IEC61000-3-2 (Class A) *7	
OTHERS	CASE SIZE	*8	50×124×117mm (W×H×D) [1.97×4.88×4.61 inches]
	WEIGHT	900g 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 excluded.
- *2 Refer to 2, instruction manual.
- *3 Please contact us about dynamic load and input response.
- *4 The output voltage is below 23.5V, the value is equal to three times of the specification.
- *5 This is the value that measured on measuring board with capacitor of 22 μ F and 0.1 μ F at 150mm from output terminal.

- Measured by 20MHz oscilloscope or Ripple-Noise meter (Equivalent to KEISOKU-GIKEN: RM103).
- *6 Please refer to the instruction manual 1.7.
- *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.
- *8 Please contact us about another class.
- *9 Case size contains neither the umbo.

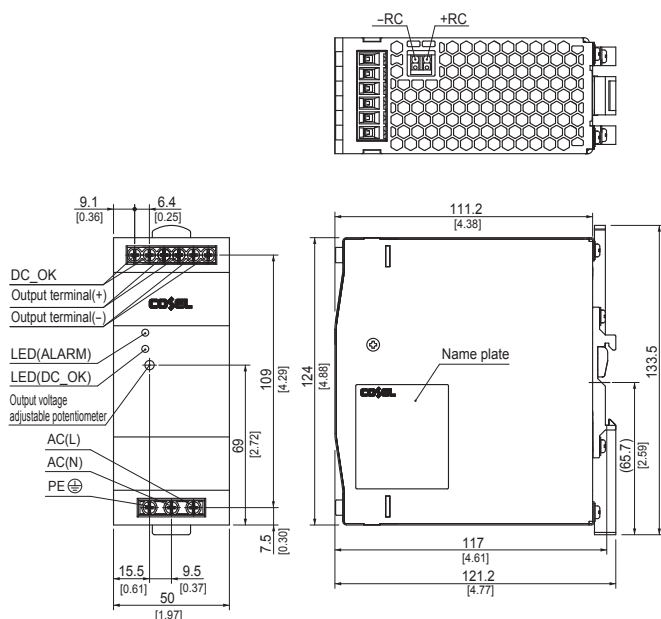
- *9 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method".
- If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
- *10 Under low DC input voltage below DC110V, the temperature derating -1°C/V or the output power derating -1%/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



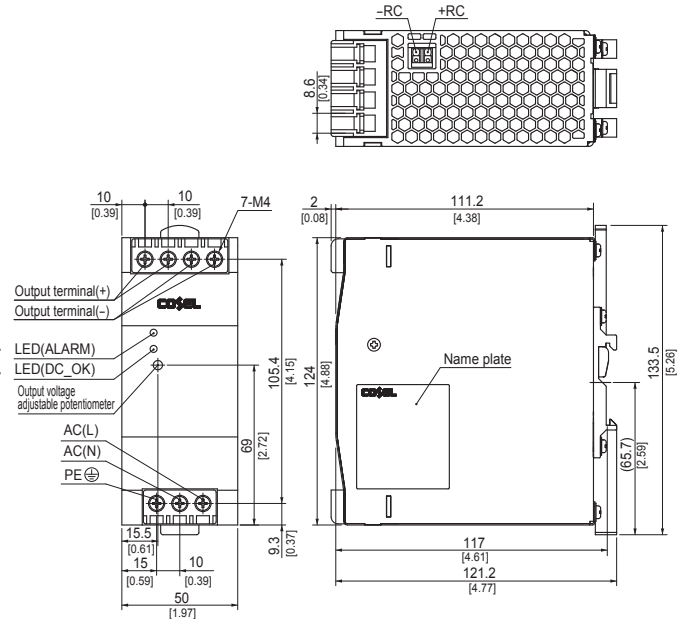
External view

<KHEA240F(Euro Style I/O Terminals)>



- ※ 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

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



- ※ 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

KHEA/KHNA480F

KH ☐ A 480 F - ☐ - ☐

① ② ③ ④ ⑤ ⑥



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



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.

- ① Series name
KHE : Euro style I/O terminals
KHN : Barrier blocks style
I/O terminals
② Single 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

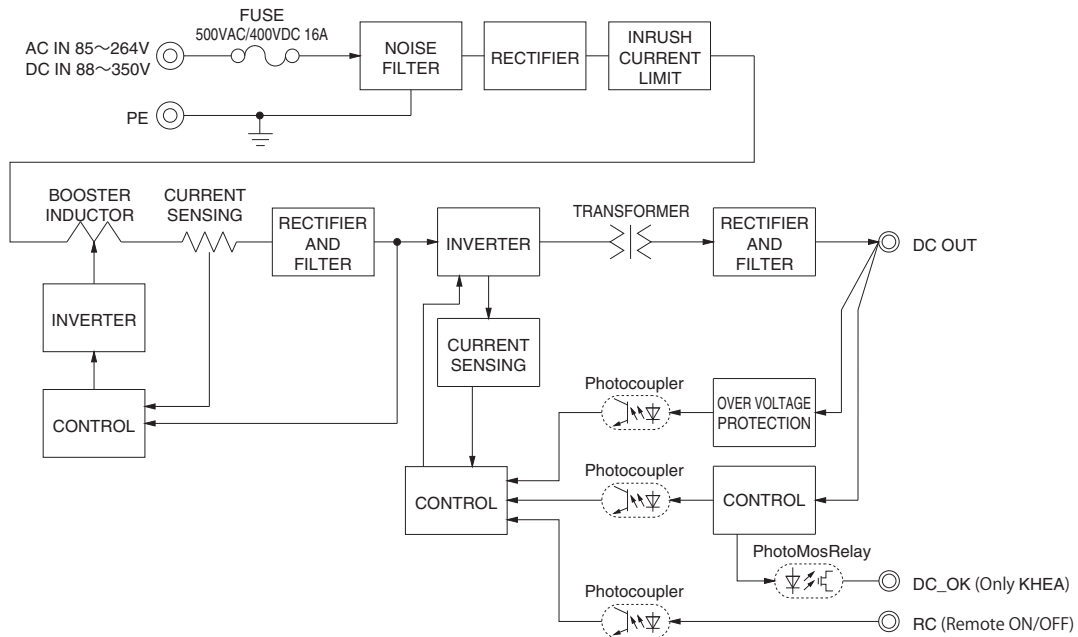
	MODEL	KHEA / KHNA480F-24	KHEA / KHNA480F-48
INPUT	VOLTAGE[V]	AC85 - 264 1 ϕ (Output derating is required) or DC88 - 350 *10	
	CURRENT[A]	ACIN 115V	4.6typ
		ACIN 230V	2.3typ
	FREQUENCY[Hz]	50 / 60 (45 - 66) or DC	
	EFFICIENCY[%]	ACIN 115V	92typ
		ACIN 230V	94typ
	POWER FACTOR	ACIN 115V	0.98typ
		ACIN 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%, According to IEC62368-1 and DEN-AN)	
OUTPUT	VOLTAGE[V]	24	48
	CURRENT[A]	20	10
	PEAK CURRENT[A]	*2 30	15
	LINE REGULATION[mV]	*3 96max (Io=30-100%) *9	192max (Io=30-100%) *9
	LOAD REGULATION[mV]	*3 150max (Io=30-100%) *9	300max (Io=30-100%) *9
	RIPPLE[mVp-p]	0 to +70°C	120max
		-25 - 0°C	240max
		Io=0 - 30%	500max
	RIPPLE NOISE[mVp-p]	0 to +70°C	150max
		-25 - 0°C	300max
		Io=0 - 30%	600max
	TEMPERATURE REGULATION[mV]	0 to +70°C	240max
		-25 to +70°C	360max
	DRIFT[mV]	*5 96max	192max
PROTECTION CIRCUIT AND OTHERS	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 $\pm$ 1.0%	48.0 $\pm$ 1.0%
	OVERCURRENT PROTECTION	Works over 101% of peak current and recovers automatically	
	OVERVOLTAGE PROTECTION[V]	30.0 to 36.0	57.6 to 67.2
ISOLATION	REMOTE ON/OFF (RC)	Provided	
	DC_OK LAMP	LED (Green)	
	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)	
ENVIRONMENT	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	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 (Refer to "Derating")	
SAFETY AND NOISE REGULATIONS	STORAGE TEMP., HUMID. AND ALTITUDE	-40 to +85°C, 20 - 90%RH (Non condensing)	
	VIBRATION	*6 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)	
OTHERS	AGENCY APPROVALS	AC input	UL60950-1, C-UL (CSA60950-1), EN62368-1, UL508, ANSI/ISA12.12.01, ATEX, GL (Only 24V), Complies with DEN-AN
		DC input	UL60950-1, C-UL (CSA60950-1), EN62368-1
	CONDUCTED NOISE	Complies with FCC-B, VCCI-B, CISPR22-B, EN55011-B, EN55022-B	
	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 inches]	
	WEIGHT	1,200g 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 excluded.
- *2 Refer to 3, instruction manual.
- *3 Please contact us about dynamic load and input response.
- *4 This is the value that measured on measuring board with capacitor of 22μF 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 1.7.
- *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 neither the umbo.
- *8 Only as standard mounting orientation (A). Refer to the "Assembling and Installation Method".

- If install other than standard mounting orientation (A), please fix the power supply for withstand the vibration and impact.
- *9 Burst 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%/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.

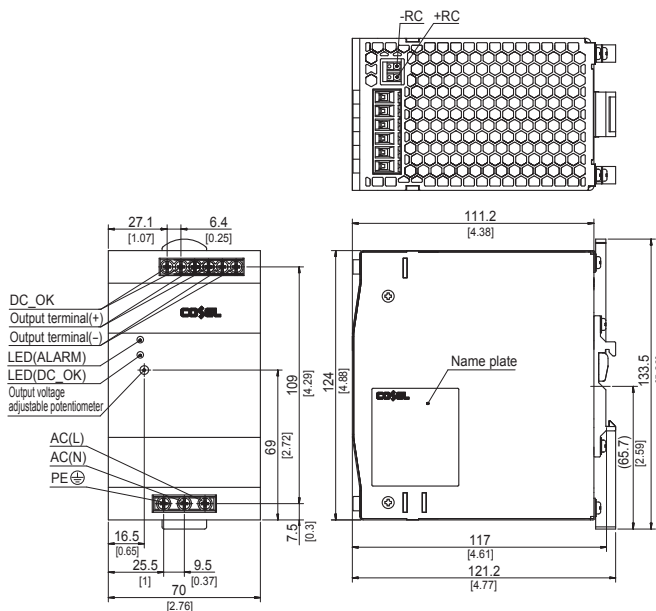
Block diagram



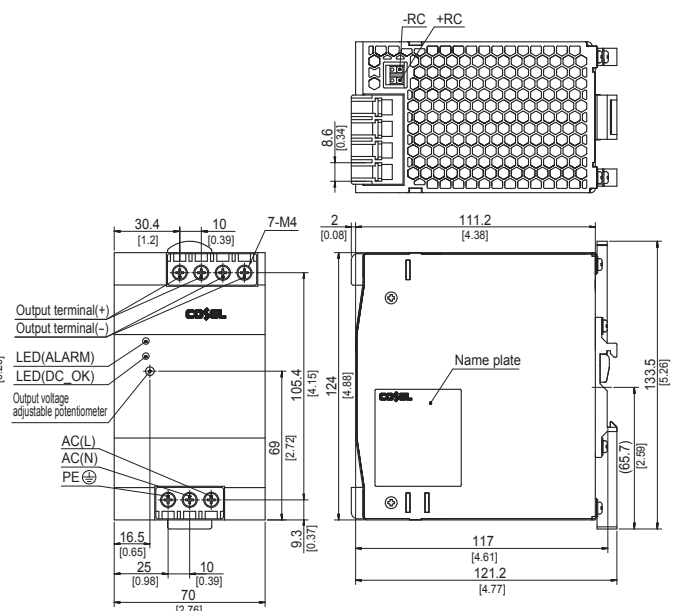
External view

<KHEA480F(Euro Style I/O Terminals)>

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



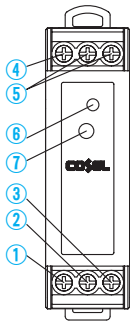
- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 1,200g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [] = inches
- ※ Screw tightening torque : 1N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



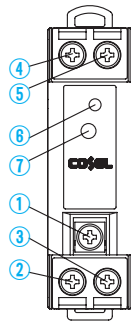
- ※ Tolerance : ±1 [±0.04]
- ※ Weight : 1,200g max
- ※ PCB Material/thickness : FR-4 / 1.6mm [0.06]
- ※ Chassis material : Aluminum
- ※ Case material : Stainless steel
- ※ DIN rail attachment material : Aluminum, Stainless steel, Nylon
- ※ Dimensions in mm, [] = inches
- ※ Screw tightening torque : 1.6N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

Terminal Blocks

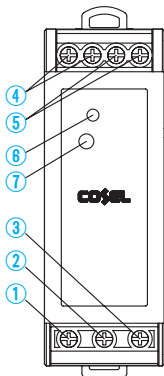
KHEA30F



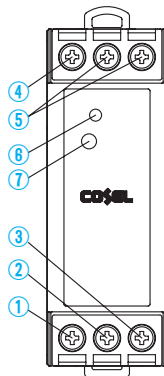
KHNA30F



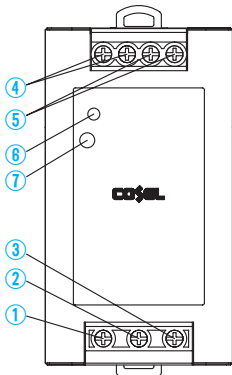
KHEA60F



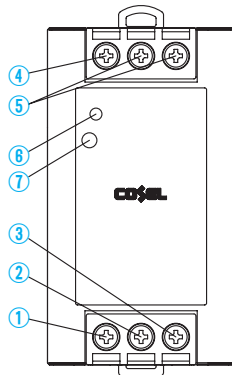
KHNA60F



KHEA90F



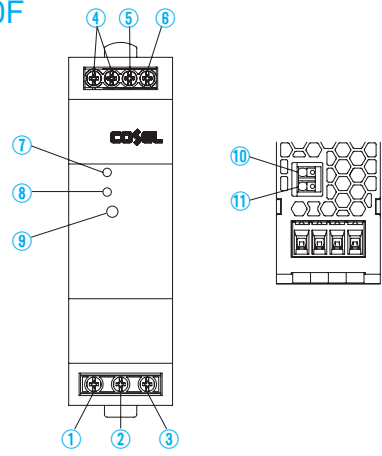
KHNA90F



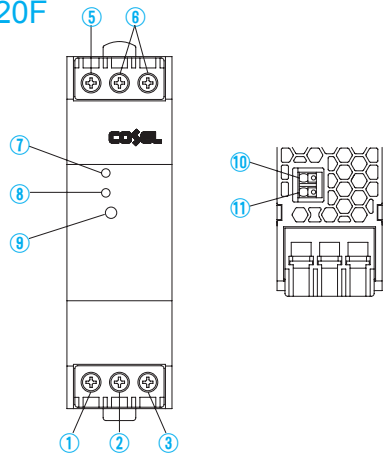
Terminal Number	Terminal Name	Function
①	PE	Protective earth Terminal
②	AC (N)	Input Terminals
③	AC (L)	
④	+VOUT	+Output Terminals
⑤	-VOUT	-Output Terminals
⑧	DC_OK	LED for output voltage confirmation
⑦	TRM	Adjustment of output voltage

Terminal Blocks

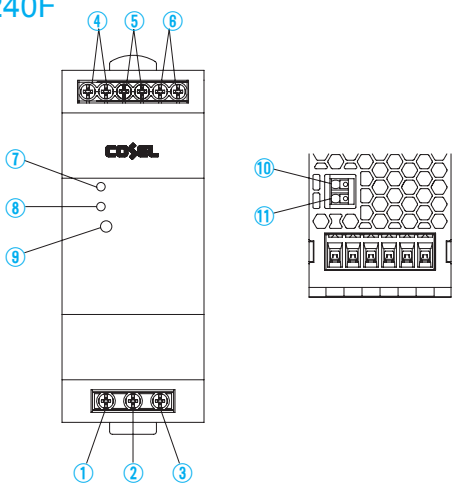
● KHEA120F



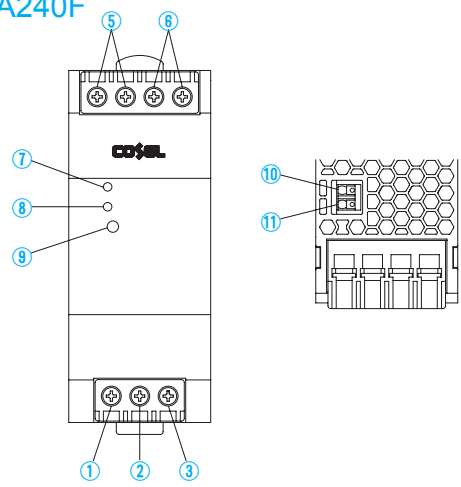
● KHNA120F



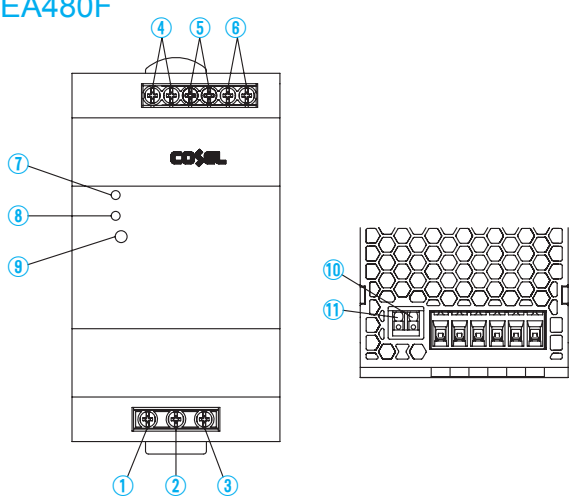
● KHEA240F



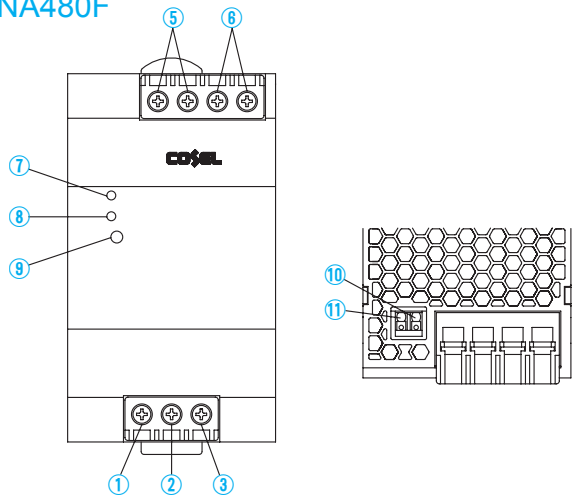
● KHNA240F



● KHEA480F



● KHNA480F



Terminal Number	Terminal Name	Function
①	PE	Protective earth Terminal
②	AC (N)	Input Terminals
③	AC (L)	
④	DC_OK	Output voltage confirmation(relay contact)
⑤	+VOUT	+Output Terminals
⑥	-VOUT	-Output Terminals

Terminal Number	Terminal Name	Function
⑦	ALARM	LED Alarm for lowered output voltage
⑧	DC_OK	LED for output voltage confirmation
⑨	TRM	Adjustment of output voltage
⑩	+RC	Remote ON/OFF Terminals
⑪	-RC	

Assembling and Installation Method

Installation method

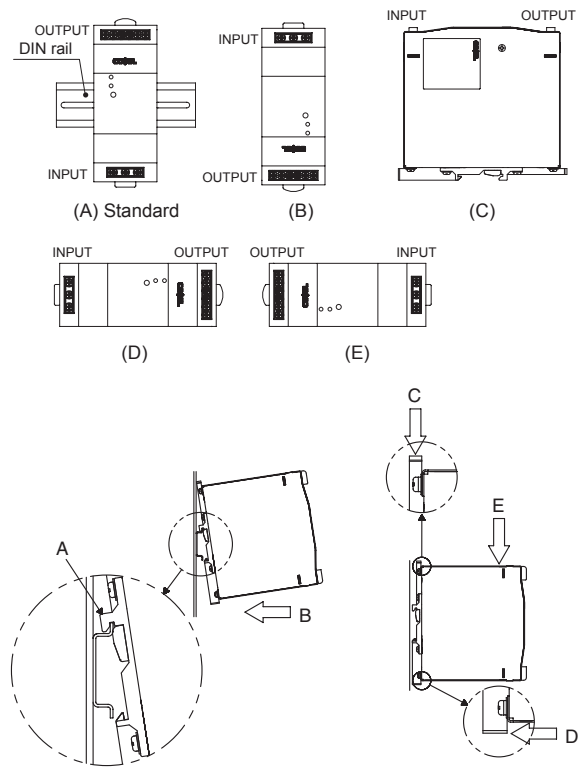
■ About DIN-Rail Attachment available with DIN EN60715 TH 35 (35×7.5mm or 35×15mm) (Top hat shaped DIN rail)

■ Below shows mounting orientation.

If install other than standard mounting orientation (A), please fix the power supply for withstand the impact and vibration.

■ When you mount a power supply on a DIN rail, have the area marked A catch one side of the rail and push the unit to the direction of B. To remove the power supply from the rail, either push down the area marked C or insert a tool such as driver to the area marked D and pull the unit apart from the rail.

When you couldn't remove the unit easily, push down the area marked C while lightly pushing the unit to the direction of E.



■ Shown below the notes about installation clearance of a unit.

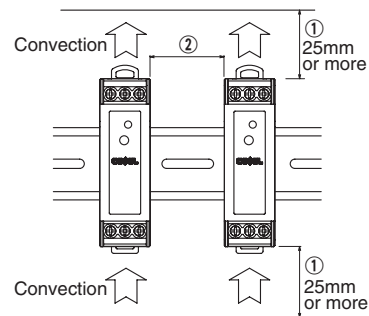
● KHEA30F/60F/90F, KHNA30F/60F/90F

① Installation clearance at above and below the unit.

Please have clearance of at least 25mm above and below the unit to avoid heat accumulation.

② Installation clearance at the side of the unit.

Please have clearance of at least 5mm side the unit to insulating the internal components. However, refer to right figure, if adjacent device of the unit (including power supply) is a heat source.



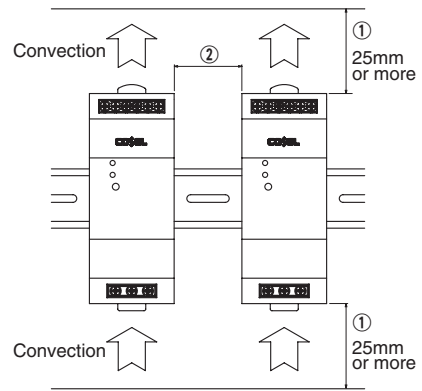
No.	Model	Adjacent device of the unit	
		Non-heat source	Heat source(*)
1	KHEA30F, KHNA30F	5mm or more	15mm or more
2	KHEA60F, KHNA60F	5mm or more	15mm or more
3	KHEA90F, KHNA90F	5mm or more	15mm or more

*Reference value when same power units are adjacent.

Assembling and Installation Method

● KHEA120F/240F/480F, KHNA120F/240F/480F

- ① Installation clearance at above and below the unit.
Please have clearance of at least 25mm above and below the unit to avoid heat accumulation.
- ② Installation clearance at the side of the unit.
Please have clearance of at least 15mm side the unit to avoid interfering with heat radiation from housing. However, refer to right figure, if adjacent device of the unit (including power supply) is a heat source.



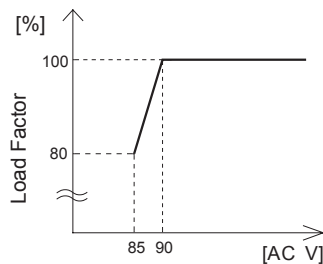
No.	Model	Adjacent device of the unit	
		Non-heat source	Heat source (*)
1	KHEA120F, KHNA120F	15mm or more	
2	KHEA240F, KHNA240F	15mm or more	
3	KHEA480F, KHNA480F	15mm or more	50mm or more

* Reference value when same power units are adjacent.

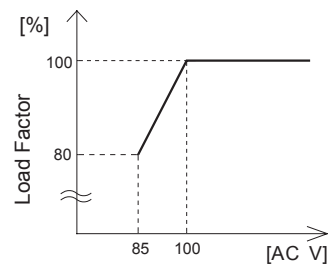
Derating

Derating curve for input voltage

● KHEA30F/60F/90F, KHNA30F/60F/90F



● KHEA480F, KHNA480F



Ambient temperature derating

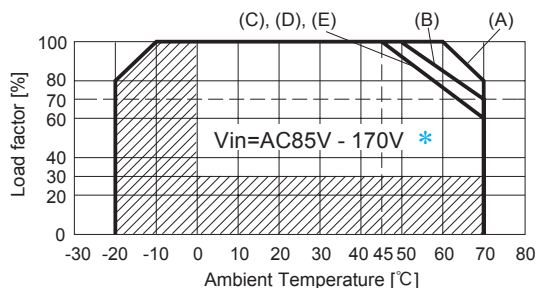
■ The operative ambient temperature as different by input voltage. Derating curve is shown below.

■ In the hatched area, the specification of Ripple, Ripple Noise is different from other area.

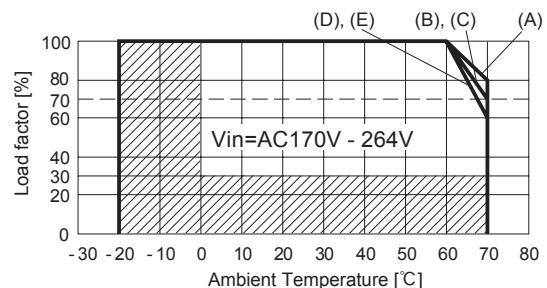
■ Derating Curve (Convection)

■ Refer to instruction manual 4 for Ambient temperature measurement point.

● KHEA30F, KHNA30F

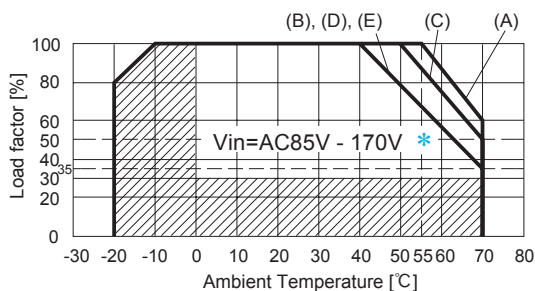


* Derating curve depend on input voltage is required.

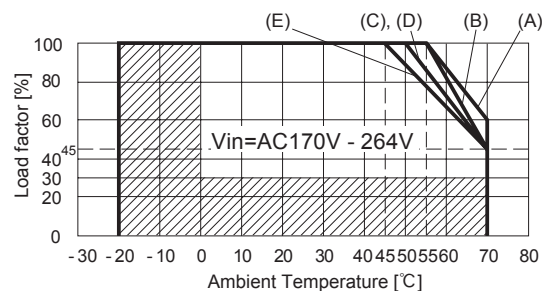


Derating

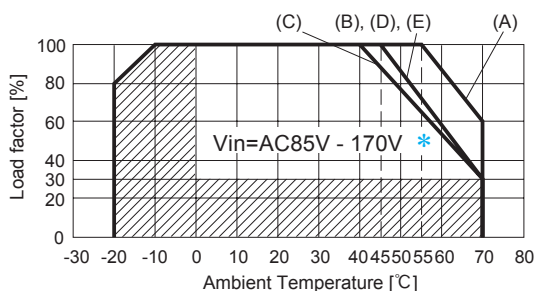
● KHEA60F, KHNA60F



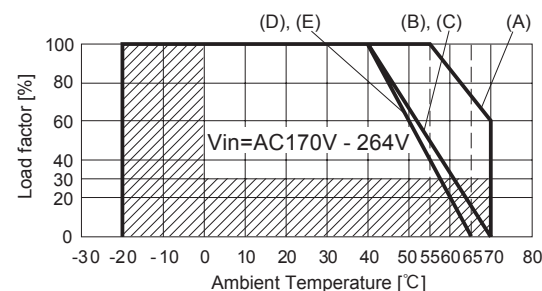
* Derating curve depend on input voltage is required.



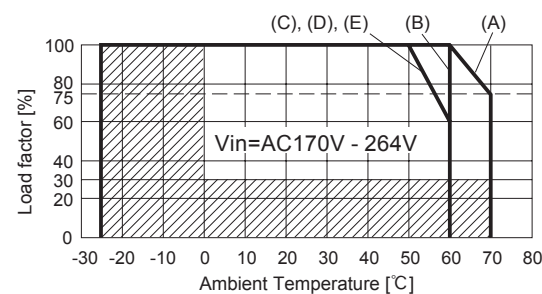
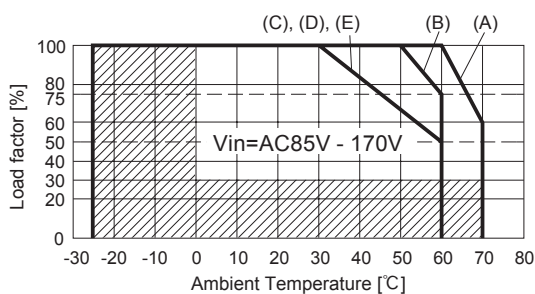
● KHEA90F, KHNA90F



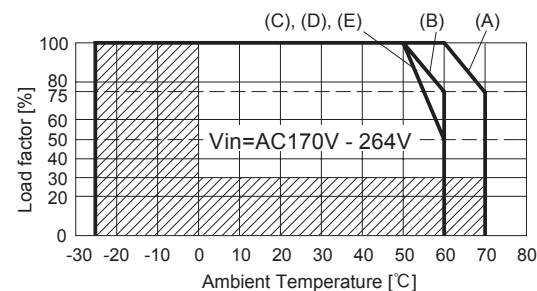
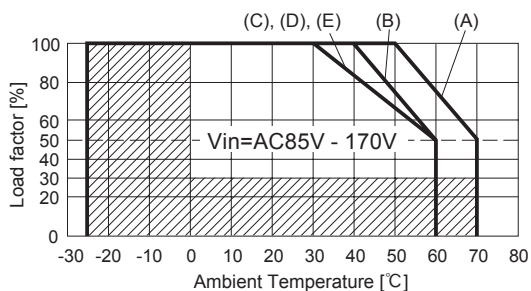
* Derating curve depend on input voltage is required.



● KHEA120F, KHNA120F

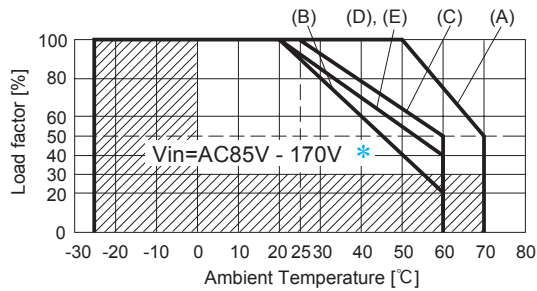


● KHEA240F, KHNA240F

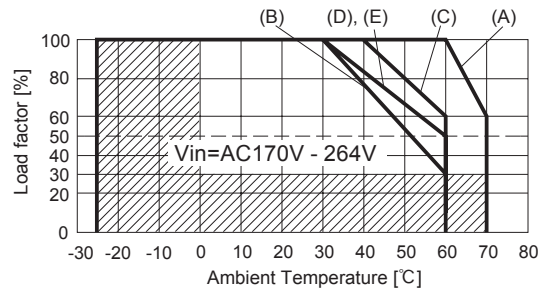


Derating

● KHEA480F, KHNA480F



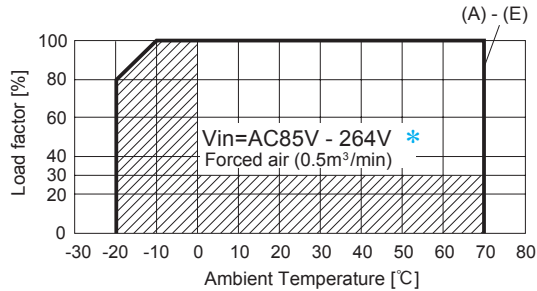
* Derating curve depend on input voltage is required.



■ Derating Curve (Forced air)

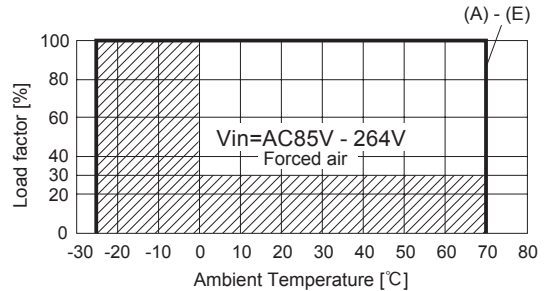
■ Use the temperature measurement point as shown in instruction manual 4. Please use at the temperature dose not exceed the values in instruction manual 4.

● KHEA30F/60F/90F, KHNA30F/60F/90F

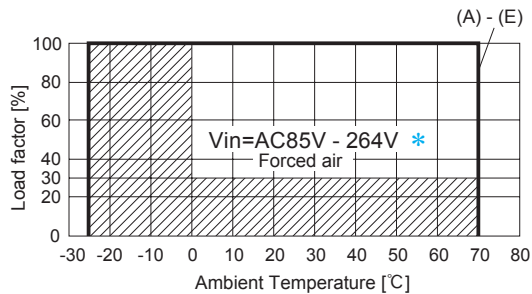


* Derating curve depend on input voltage is required.

● KHEA120F/240F, KHNA120F/240F



● KHEA480F, KHNA480F



* Derating curve depend on input voltage is required.

Instruction Manual

◆ It is necessary to read the "Instruction Manual" and "Before using our product" before you use our product.

Basic Characteristics Data

Model	Circuit method	Switching frequency *2 [kHz]	Input current [A] *1	Rated input fuse	Inrush current protection circuit	PCB/Pattern			Series/Parallel operation availability	
						Material	Single sided	Double sided	Series operation	Parallel operation
KHEA30F KHNA30F	Flyback converter	50 - 200	0.55	500VAC/400VDC 3.15A	Thermistor	FR-4		Yes	Yes	No
KHEA60F KHNA60F	Flyback converter	50 - 200	1.10	500VAC/400VDC 3.15A	Thermistor	FR-4		Yes	Yes	No
KHEA90F KHNA90F	Active filter Flyback converter	20 - 500 50 - 200	0.95	500VAC/400VDC 3.15A	Thermistor	FR-4		Yes	Yes	No
KHEA120F KHNA120F	Active filter LLC resonant converter	60 - 550 45 - 350	1.2	500VAC/400VDC 5A	Thermistor	FR-4		Yes	Yes	No
KHEA240F KHNA240F	Active filter LLC resonant converter	60 - 550 45 - 350	2.3	500VAC/400VDC 8A	SCR	FR-4		Yes	Yes	No
KHEA480F KHNA480F	Active filter LLC resonant converter	60 - 150 45 - 350	4.6	500VAC/400VDC 16A	Relay	FR-4		Yes	Yes	No

*1 The value of input current is at ACIN 115V and 100%.

*2 Burst operation at light loading, frequency is change by use condition.
Please contact us about detail.